F-35A Training Basing
Environmental Impact Statement

Final

Volume II

(Appendix A through Appendix C)

June 2012

Report Documentation Page

Form Approved
OMB No. 0704-0188

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14. ABSTRACT

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How to Use This Document

Our goal is to give you a reader-friendly document that provides an in-depth, accurate analysis of the Proposed Action, the alternative beddown locations, and the potential environmental consequences for each base. The organization of this Final Environmental Impact Statement (Final EIS) is shown below.

Overall Proposal

Table of Contents, List of Figures, List of Tables, and Acronyms and Abbreviations

Preface: Detailed Guide for Reading the EIS → The Preface provides a detailed guide for reading the EIS.

Chapter 1: Purpose and Need for F-35A Training Basing → Chapter 1 explains the decision made by Congress to provide the U.S. Air Force with a next-generation fighter. Also described are the features of the F-35A, how the F-35A will be based, and how aircrews will train for their operational assignments.

Chapter 2:
- Overview of Proposed Action and Alternatives
- Alternative Identification Process
- Summary Comparison of Proposed Action and Alternatives

→ Chapter 2 provides an overview of the Proposed Action and alternatives, which is to beddown the F-35A at Boise AGS, Holloman AFB, Luke AFB, and/or Tucson AGS.

Chapter 3: Resource Definition and Methodology for Analysis → Chapter 3 defines the environmental resources that could potentially be affected by the Proposed Action and explains the methodology used to evaluate the potential impacts.

Chapter 4: Base-Specific Sections → Base-specific sections are listed below.

Base Specific Information

Boise AGS	Holloman AFB	Luke AFB	Tucson AGS
Section BO 1.0 Alternative Overview	**Section HO 1.0** Alternative Overview	**Section LU 1.0** Alternative Overview	**Section TU 1.0** Alternative Overview
Section BO 2.0 Base-Specific Project Details	**Section HO 2.0** Base-Specific Project Details	**Section LU 2.0** Base-Specific Project Details	**Section TU 2.0** Base-Specific Project Details
Section BO 3.0 Affected Environment and Environmental Consequences	**Section HO 3.0** Affected Environment and Environmental Consequences	**Section LU 3.0** Affected Environment and Environmental Consequences	**Section TU 3.0** Affected Environment and Environmental Consequences
Section BO 4.0 Cumulative Effects, Irreversible and Irretrievable Commitment of Resources	**Section HO 4.0** Cumulative Effects, Irreversible and Irretrievable Commitment of Resources	**Section LU 4.0** Cumulative Effects, Irreversible and Irretrievable Commitment of Resources	**Section TU 4.0** Cumulative Effects, Irreversible and Irretrievable Commitment of Resources

Overall Proposal

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DEIS Comments

Appendix D, D.1, D.2, and D.3 Receipt and Locating Comments Volume 2	**Appendix D, D.4 and D.5** Alphabetical Directory Volume 2	**Appendix D, D.6, D.7, D.8, and D.9** Copies of Letters and Transcripts Volume 2	**Appendix D, D.10** Response to Comments Volume 2

Final

F-35A Training Basing
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Acronyms

Acronyms

A.D.	*Anno Domini*
AFB	Air Force Base
AGS	Air Guard Station
Air Force	U.S. Air Force
ANSI	American National Standards Institute
APZ	Accident Potential Zone
ArNG	Army National Guard
ASA	Acoustical Society of America
ATCAA	Air Traffic Control Assigned Airspace
BMGR	Barry M. Goldwater Range
BP	before the present
CAA	Clean Air Act
CDNL	C-weighted day–night average sound level
CHABA	Committee on Hearing, Bioacoustics and Biomechanics
CSEL	C-weighted sound exposure level
dB	decibel
dBA	A-weighted decibel
DNL	day–night average sound level
DoD	U.S. Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FG	Fighter Group
FICAN	Federal Interagency Committee on Aircraft Noise
FICON	Federal Interagency Committee on Noise
FS	Fighter Squadron
FW	Fighter Wing
Hz	hertz
IDANG	Idaho Air National Guard
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
IR	Instrument Route
L	selected threshold level
L_{Amax}	A-weighted maximum noise level
L_{dnmr}	onset rate-adjusted day–night average sound level
L_{eq}	equivalent sound level
L_{max}	maximum noise level
MCAS	Marine Corps Air Station
MOA	Military Operations Area
MR_NMAP	MOA-Range NOISEMAP
MSL	mean sea level
MTR	Military Training Route
NA	Number-of-events Above
NAL	Number-of-events Above a selected threshold level
NATO	North Atlantic Treaty Organization
NEPA	National Environmental Policy Act
NIOSH	National Institute of Occupational Safety and Health
NIPTS	Noise-Induced Permanent Threshold Shift
NLR	noise level reduction
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PAA	Primary Aircraft Authorized
PHL	potential hearing loss
POI	point of interest
psf	pounds per square foot
PTS	Permanent Threshold Shift
SEL	sound exposure level
SHPO	State Historic Preservation Office
TFW	Tactical Fighter Wing
TTS	Temporary Threshold Shift
UCLA	University of California, Los Angeles
USFWS	U.S. Fish and Wildlife Service
VR	Visual Route
WG	Wing
WHO	World Health Organization

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Appendix A
Public Involvement

Appendix A. Public Involvement

A.1 Notice of Intent

is also available on the CPSC Web site at *http://www.cpsc.gov.*

Dated: December 17, 2009.

Todd A. Stevenson,

Secretary, Consumer Product Safety Commission.

[FR Doc. E9–30486 Filed 12–24–09; 8:45 am]

BILLING CODE 6355–01–P

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE AIR FORCE

Notice of Intent To Prepare an Environmental Impact Statement for Beddown of Training F–35A Aircraft

AGENCY: Air Education and Training and Air National Guard, United States Air Force.

ACTION: Notice of Intent.

SUMMARY: Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321, *et seq.*), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500–1508), and Air Force policy and procedures (32 CFR Part 989), the Air Force is issuing this notice to advise the public of its intent to prepare an Environmental Impact Statement (EIS) to assess the potential environmental impacts of establishing training F–35 Joint Strike Fighter (JSF) aircraft at one or more existing Air Force installations within the continental United States.

The proposed basing alternatives are Luke AFB, Arizona; Holloman AFB, New Mexico; Eglin AFB, Florida; Air Terminal Air Guard Station, Idaho; and Tucson International Airport Air Guard, Arizona. Each candidate base is an alternative. The potential environmental impacts for each alternative will be analyzed for no action and in six increments of 24 primary assigned aircraft.

The Air Force version of the F–35 JSF, designated F–35A, is a conventional take-off, multiple-role fighter with an emphasis on air-to-ground missions. The aircraft was designed to supplement and eventually replace legacy aircraft as well as complement the air-to-air mission of the F–22A Raptor. At any of the alternative locations, the beddown action would involve personnel changes, facility construction and modifications, and aircraft training operations.

Scoping: In order to effectively define the full range of issues to be evaluated in the EIS, the Air Force will determine the scope of the EIS (*i.e.*, what will be covered and in what detail) by soliciting scoping comments from interested state and federal agencies and interested members of the public through the **Federal Register** and various media in the local areas of concern. Scoping comments should be submitted to the address below by the date indicated. The Air Force will also hold a series of scoping meetings to further solicit input regarding the scope of the proposed action and alternatives.

DATES: Scoping meetings will be held in the potentially impacted communities. The scheduled dates, times, locations and addresses for the meetings will be published in local media a minimum of 15 days prior to the scoping meetings. The Air Force intends to hold scoping meetings in the following communities: January 25–29, 2010 Carrizozo, Alamogordo, Truth or Consequences, Socorro, and Fort Sumner, New Mexico; February 8–12, 2010 Marsing, Boise, Meridian, and Bruneau Idaho; February 22–26, 2010 El Mirage, Sun City, Gila Bend, Wickenburg, and Litchfield Park, Arizona; March 1–5, 2010 Tucson, San Carlos, Safford, Bisbee, Arizona.

Comments will be accepted at any time during the environmental impact analysis process. However, to ensure the Air Force has sufficient time to consider public input in the preparation of the Draft EIS, comments should be submitted to the address below by March 25, 2010.

FOR FURTHER INFORMATION CONTACT: Mr. David Martin, HQ AETC/A7PP, 266 F Street West, Randolph AFB, TX 78150–4319, telephone 210–652–1962.

Bao-Anh Trinh, YA–3, DAF,

Air Force Federal Register Liaison Officer.

[FR Doc. E9–30664 Filed 12–24–09; 8:45 am]

BILLING CODE 5001–05–P

DEPARTMENT OF DEFENSE

Department of the Navy

Meeting of the Ocean Research and Resources Advisory Panel

AGENCY: Department of the Navy, DOD.

ACTION: Notice of open meeting.

SUMMARY: The Ocean Research and Resources Advisory Panel (ORRAP) will meet for the regular spring meeting. All sessions of the meeting will remain open to the public.

DATES: The meeting will be held on Monday, March 15, 2010, from 8:30 a.m. to 5:30 p.m. and Tuesday, March 16, 2010, from 8:30 a.m. to 2:45 p.m. In order to maintain the meeting time schedule, members of the public will be limited in their time to speak to the Panel. Members of the public should submit their comments one week in advance of the meeting to the meeting Point of Contact.

ADDRESSES: The meeting will be held at the Consortium for Ocean Leadership, 1201 New York Avenue, NW., 4th floor, Washington, DC, 20005.

FOR FURTHER INFORMATION CONTACT: Dr. Charles L. Vincent, Office of Naval Research, 875 North Randolph Street, Suite 1425, Arlington, VA 22203–1995, telephone 703–696–4118.

SUPPLEMENTARY INFORMATION: This notice of open meeting is provided in accordance with the Federal Advisory Committee Act (5 U.S.C. App. 2). The meeting will include discussions on ocean research to applications, ocean observing, professional certification programs, and other current issues in the ocean science and resource management communities.

Dated: December 16, 2009.

A.M. Vallandingham,

Lieutenant Commander, Judge Advocate General's Corps, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. E9–30681 Filed 12–24–09; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF EDUCATION

Notice of Proposed Information Collection Requests

AGENCY: Department of Education.

SUMMARY: The Acting Director, Information Collection Clearance Division, Regulatory Information Management Services, Office of Management, invites comments on the proposed information collection requests as required by the Paperwork Reduction Act of 1995.

DATES: Interested persons are invited to submit comments on or before February 26, 2010.

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its statutory obligations. The Acting Director, Information Collection Clearance Division, Regulatory

Type of Review: New.
Agency: Corporation for National and Community Service.
Title: Senior Corp RSVP Community Stakeholder Assessment.
OMB Number: None.
Agency Number: None.
Affected Public: Community Advisory Boards of current recipients of Senior Corps RSVP Grants.
Total Respondents: 700.
Frequency: Annual.
Average Time per Response: 2.5 hours.
Estimated Total Burden Hours: 1,750 hours.
Total Burden Cost (capital/startup): None.
Total Burden Cost (operating/maintenance): None.

Comments submitted in response to this notice will be summarized and/or included in the request for Office of Management and Budget approval of the information collection request; they will also become a matter of public record.

Dated: January 6, 2010.

Angela Roberts,

Acting Director, Senior Corps.

[FR Doc. 2010–357 Filed 1–11–10; 8:45 am]

BILLING CODE 6050–$$–P

CORPORATION FOR NATIONAL AND COMMUNITY SERVICE

Information Collection; Submission for OMB Review, Comment Request

AGENCY: Corporation for National and Community Service.

ACTION: Notice.

SUMMARY: The Corporation for National and Community Service (hereinafter the "Corporation"), has submitted a public information collection request (ICR) entitled VISTA Alumni Outreach to the Office of Management and Budget (OMB) for review and approval in accordance with the Paperwork Reduction Act of 1995, Public Law 104–13, (44 U.S.C. Chapter 35). Copies of this ICR, with applicable supporting documentation, may be obtained by calling the Corporation for National and Community Service, Elizabeth Matthews at (202) 606–6774. Individuals who use a telecommunications device for the deaf (TTY–TDD) may call (202) 606–3472 between 8:30 a.m. and 5 p.m. Eastern Time, Monday through Friday.

ADDRESSES: Comments may be submitted, identified by the title of the information collection activity, to the Office of Information and Regulatory Affairs, Attn: Ms. Sharon Mar, OMB Desk Officer for the Corporation for National and Community Service, by any of the following two methods within 30 days from the date of publication in this **Federal Register**:

(1) By fax to: (202) 395–6974, Attention: Ms. Sharon Mar, OMB Desk Officer for the Corporation for National and Community Service; and

(2) Electronically by e-mail to: *smar@omb.eop.gov.*

SUPPLEMENTARY INFORMATION: The OMB is particularly interested in comments which:

- Evaluate whether the proposed collection of information is necessary for the proper performance of the functions of the Corporation, including whether the information will have practical utility;
- Evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;
- Propose ways to enhance the quality, utility, and clarity of the information to be collected; and
- Propose ways to minimize the burden of the collection of information on those who are to respond, including through the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submissions of responses.

Comments

A 60-day public comment Notice was published in the **Federal Register** on November 5, 2009. This comment period ended on Friday, December 4, 2009. No public comments were received from this Notice.

Description: The Corporation is seeking approval of VISTA Alumni Outreach information collection. The goal of this project is to contact the 177,000 VISTA Alumni and ask them to take three actions; (1) Go online to VISTACampus.org and create an account; (2) Go online to My.AmeriCorps.gov and register; (3) Fill out a questionnaire IF they are interested in promoting and recruiting for VISTA. By creating an account through the VISTACampus.org and registering through MyAmeriCorps.gov, we can obtain their email addresses and keep them informed about future alumni-related activities. This is especially important as VISTA is celebrating its 45th anniversary in 2010 and there will be numerous activities for alumni to participate in across the country.

The Corporation has obtained the mailing addresses for all 177,000 alumni. There have been two postcards designed to mail to the alumni. The postcard text directs alumni to the VISTACampus.org and MyAmeriCorps.gov to update their contact information. When approved, the postcards will be mailed, information will be posted on the VISTA Campus explaining the registration process, the questionnaire will be posted, and alumni can begin to participate in recruitment efforts.

Type of Review: New Information Collection.
Agency: Corporation for National and Community Service.
Title: VISTA Alumni Outreach.
OMB Number: None.
Agency Number: None.
Affected Public: AmeriCorps VISTA Alumni.
Total Respondents: 177,000.
Frequency: Ongoing.
Average Time per Response: Estimated at 30 minutes for first time respondents and 15 minutes for previously registered alumni updating information. Estimated 30 minutes for VISTA alumni outreach questionnaire (estimated 500 people).
Estimated Total Burden Hours: 88,500 (for alumni creating and updating accounts on both VISTACampus.org and My.AmeriCorps.gov/250 (for alumni completing questionnaire).
Total Burden Cost (capital/startup): None.
Total Burden Cost (operating/maintenance): None.

Dated: January 6, 2010.

Paul Davis,

Acting Director, AmeriCorps VISTA.

[FR Doc. 2010–371 Filed 1–11–10; 8:45 am]

BILLING CODE 6050–$$–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Notice of Intent To Prepare an Environmental Impact Statement for Beddown of Training F–35A Aircraft

AGENCY: Air Education and Training and Air National Guard, United States Air Force, Defense.

ACTION: Revised Notice of Intent.

SUMMARY: The United States Air Force published a Notice of Intent to prepare an EIS in the **Federal Register** (Vol. 74, No. 247, page 68597) on Dec 28, 2009. As stated in the previous Notice of Intent, the Air Force intended to conduct scoping meeting in the following cities: Truth or Consequences, NM, Socorro, NM, and Sun City, AZ; however, Scoping Meetings will no

longer be conducted in these locations. Additional public scoping meetings will be held at Cloudcroft, NM, Boise, ID, City of Surprise/Sun Cities, AZ, and Tucson, AZ. In addition, exact meeting locations were not known at the time the Notice of Intent was published. This revised Notice of Intent has been prepared to notify the public of the changes in the cities in which the public scoping meetings will be held and to provide locations and dates for the meetings.

DATES: The Air Force intends to hold scoping meetings in the following communities: Holloman Air Force Base: Monday, January 25, 2010, at Lincoln County Manager's Building Commissioners Chambers, 300 Central Avenue Carrizozo, New Mexico; Tuesday, January 26, 2010, at Sgt. Willie Estrada Memorial Civic Center, 800 E. First Street, Alamogordo, New Mexico; Wednesday, January 27, 2010 at The Lodge Resort Pavilion Room, 601 Corona Place, Cloudcroft, New Mexico; Thursday, January 28, 2010 at Best Western Pine Springs Inn, 1420 W. Highway 70, Ruidoso Downs, New Mexico; Friday, January 29, 2010 at De Baca County Courthouse Annex, 248 East Avenue C, Fort Sumner, New Mexico; Boise Air Terminal Air Guard Station: Monday, February 8, 2010, at Marsing High School Commons, 301 W. Eighth Avenue, Marsing, Idaho; Tuesday, February 9, 2010, at Boise Senior Activities Center Dining Room, 690 Robbins Road, Boise, Idaho; Wednesday, February 10, 2010, at Meridian Middle School Foyer/Auditorium, 1507 W. Eighth Street, Meridian, Idaho; Thursday, February 11, 2010, at Best Western Vista Inn Rocky Mountain Conference Center, 2645 Airport Way, Boise, Idaho; Friday, February 12, 2010, at Rimrock Jr./Sr. High School Auditorium, 39678 State Highway 78, Bruneau, Idaho; Luke Air Force Base: Monday, February 22, 2010 at Gila Bend Unified School District, 308 N. Martin Avenue, Gila Bend, Arizona; Tuesday, February 23, 2010 at Pueblo El Mirage RV Resort RC Roberts Memorial Building, 11201 N. El Mirage Road, El Mirage, Arizona; Wednesday, February 24, 2010 at Communiversity @ Surprise, 15850 West Civic Center Plaza, City of Surprise/Sun Cities, Arizona; Thursday, February 25, 2010 at Wickenburg High School Media Center, 1090 S. Vulture Mine Road, Wickenburg, Arizona; Friday, February 26, 2010 at Wigwam Resort, 300 Wigwam Boulevard, Litchfield Park, Arizona; Tucson International Airport Air Guard Station: Monday, March 1, 2010, at Sunnyside High School Foyer/Auditorium, 1725 E. Bilby Road, Tucson, Arizona; Tuesday, March 2, 2010, at San Carlos High School Cafeteria, Milepost 270 Highway 70, San Carlos, Arizona; Wednesday, March 3, 2010, at Eastern Arizona College Gila/Galiuro Room, Activities Center, 1014 N. College Avenue, Thatcher, Arizona; Thursday, March 4, 2010, at Bisbee High School Cafeteria, 475 School Terrace Road, Bisbee, Arizona; Friday, March 5, 2010, at Roskruge Elementary School Auditorium 501 East Sixth Street, Tucson, Arizona. The scheduled dates, times, locations and addresses for the meetings will be published in local media a minimum of 15 days prior to the scoping meetings. All meetings will be held from 6 p.m. to 8 p.m.

Comments will be accepted at any time during the environmental impact analysis process. However, to ensure the Air Force has sufficient time to consider public input in the preparation of the Draft EIS, comments should be submitted to the address below by April 5, 2010.

FOR FURTHER INFORMATION CONTACT: Mr. David Martin, HQ AETC/A7CPP, 266 F Street West, Randolph AFB, TX 78150–4319, telephone 210/652–1961.

Bao-Anh Trinh,

Air Force Federal Register Liaison Officer.

[FR Doc. 2010–287 Filed 1–11–10; 8:45 am]

BILLING CODE 5001–05–P

DEPARTMENT OF EDUCATION

Notice of Proposed Information Collection Requests

AGENCY: Department of Education

SUMMARY: The Acting Director, Information Collection Clearance Division, Regulatory Information Management Services, Office of Management, invites comments on the proposed information collection requests as required by the Paperwork Reduction Act of 1995.

DATES: Interested persons are invited to submit comments on or before March 15, 2010.

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its statutory obligations. The Acting Director, Information Collection Clearance Division, Regulatory Information Management Services, Office of Management, publishes that notice containing proposed information collection requests prior to submission of these requests to OMB. Each proposed information collection, grouped by office, contains the following: (1) Type of review requested, e.g., new, revision, extension, existing or reinstatement; (2) Title; (3) Summary of the collection; (4) Description of the need for, and proposed use of, the information; (5) Respondents and frequency of collection; and (6) Reporting and/or Recordkeeping burden. OMB invites public comment.

The Department of Education is especially interested in public comment addressing the following issues: (1) Is this collection necessary to the proper functions of the Department; (2) will this information be processed and used in a timely manner; (3) is the estimate of burden accurate; (4) how might the Department enhance the quality, utility, and clarity of the information to be collected; and (5) how might the Department minimize the burden of this collection on the respondents, including through the use of information technology.

Dated: January 7, 2010.

James Hyler,

Acting Director, Information Collection Clearance Division, Regulatory Information Management Services, Office of Management.

Office of Vocational and Adult Education

Type of Review: Revision.

Title: Carl D. Perkins Vocational and Technical Education Act (PL 105–332)—State Plan.

Frequency: Annually.

Affected Public: State, Local, or Tribal Gov't, SEAs or LEAs.

Reporting and Recordkeeping Hour Burden:

Responses: 56.

Burden Hours: 3,834.

Abstract: PL 105–332 requires eligible State agencies to submit a 5-year State plan, with annual revisions as the agency deems necessary, in order to receive Federal funds. Program staff review the plans for compliance and quality.

Requests for copies of the proposed information collection request may be accessed from *http://edicsweb.ed.gov,* by selecting the "Browse Pending Collections" link and by clicking on link number 4198. When you access the

Dated: January 27, 2010.

Mitchell S. Bryman,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 2010–1960 Filed 1–29–10; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Revised Notice of Intent To Prepare an Environmental Impact Statement for Beddown of Training F–35A Aircraft

AGENCY: Air Education and Training and Air National Guard, United States Air Force.

ACTION: Notice of Intent.

SUMMARY: The United States Air Force published a Notice of Intent to prepare an EIS in the **Federal Register** (Vol 74, Bi, 249, page 69080) on Dec 28, 2009. The phone number that was listed for the point of contact was entered incorrectly. This revised Notice of Intent has been prepared to notify the public of the correct phone number to be used for gaining further information.

FOR FURTHER INFORMATION CONTACT: Mr. David Martin, HQ ACC/A7PP, 266 F Street West, Randolph AFB, TX 78150–4319, telephone 210–852–1961.

Bao-Anh Trinh,

Air Force Federal Register Liaison Officer.

[FR Doc. 2010–2057 Filed 1–29–10; 8:45 am]

BILLING CODE 5001–05–P

DEPARTMENT OF EDUCATION

Submission for OMB Review; Comment Request

AGENCY: Department of Education.

SUMMARY: The Acting Director, Information Collection Clearance Division, Regulatory Information Management Services, Office of Management invites comments on the submission for OMB review as required by the Paperwork Reduction Act of 1995.

DATES: Interested persons are invited to submit comments on or before March 3, 2010.

ADDRESSES: Written comments should be addressed to the Office of Information and Regulatory Affairs, Attention: Education Desk Officer, Office of Management and Budget, 725 17th Street, NW., Room 10222, New Executive Office Building, Washington, DC 20503, be faxed to (202) 395–5806 or send e-mail to *oira_submission@omb.eop.gov.*

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its statutory obligations. The Acting Director, Information Collection Clearance Division, Regulatory Information Management Services, Office of Management, publishes that notice containing proposed information collection requests prior to submission of these requests to OMB. Each proposed information collection, grouped by office, contains the following: (1) Type of review requested, *e.g.* new, revision, extension, existing or reinstatement; (2) Title; (3) Summary of the collection; (4) Description of the need for, and proposed use of, the information; (5) Respondents and frequency of collection; and (6) Reporting and/or Recordkeeping burden. OMB invites public comment.

Dated: January 27, 2010.

James Hyler,

Acting Director, Information Collection Clearance Division, Regulatory Information Management Services, Office of Management.

Office of Special Education and Rehabilitative Services

Type of Review: Revision.

Title: Application for Grants under Disability and Rehabilitation Research.

Frequency: Review and Monitoring.

Affected Public: Businesses or other for-profit; Not-for-profit institutions.

Reporting and Recordkeeping Hour Burden:

Responses: 655.

Burden Hours: 131,000.

Abstract: This application package invites grants for research and related activities in Rehabilitation of Individuals with disabilities. This is in response to Public Law 93–112, Secs. 14(a) and 762, Rehabilitation Act of 1973, as amended. This grant application package contains program profiles, standard forms, program regulations, **Federal Register** information, FAQs, and transmitting instructions. Applications are primarily institutions of higher education, but may also include States; public or private agencies, including for-profit agencies; public or private organizations, including for-profit organizations and hospitals; and Indian tribes and tribal organizations. NIDRR's Research Fellowship is for qualified individuals only.

This information collection is being submitted under the Streamlined Clearance Process for Discretionary Grant Information Collections (1894–0001). Therefore, the 30-day public comment period notice will be the only public comment notice published for this information collection.

Requests for copies of the information collection submission for OMB review may be accessed from *http://edicsweb.ed.gov,* by selecting the "Browse Pending Collections" link and by clicking on link number 4206. When you access the information collection, click on "Download Attachments" to view. Written requests for information should be addressed to U.S. Department of Education, 400 Maryland Avenue, SW., LBJ, Washington, DC 20202–4537. Requests may also be electronically mailed to the Internet address *ICDocketMgr@ed.gov* or faxed to 202–401–0920. Please specify the complete title of the information collection when making your request.

Comments regarding burden and/or the collection activity requirements should be electronically mailed to *ICDocketMgr@ed.gov.* Individuals who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1–800–877–8339.

[FR Doc. 2010–2051 Filed 1–29–10; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF EDUCATION

Submission of Data by State Educational Agencies

AGENCY: National Center for Education Statistics, Institute of Education Sciences, Department of Education.

ACTION: Notice of dates of submission of State revenue and expenditure reports for fiscal year (FY) 2009 and of revisions to those reports.

SUMMARY: The Secretary announces dates for the submission by State educational agencies (SEAs) of expenditure and revenue data and average daily attendance statistics on ED Form 2447 (the National Public Education Financial Survey (NPEFS)) for FY 2009. The Secretary sets these dates to ensure that data are available to serve as the basis for timely distribution of Federal funds. The U.S. Bureau of the Census (Bureau of the Census) is the data collection agent for the National

Needs and Uses: This information collection is used by contracting officers for two distinct purposes.

Audit Services. The clause at 252–237.7000 is used to provide information that enables verification that the apparently successful offeror for audit services is licensed by the cognizant licensing authority in the state or other political jurisdiction where the offeror operates its professional practice.

Mortuary Services. The clause at DFARS 252–237.7001 and DD Form 2063 are used (a) to ensure that the mortuary contractor has properly prepared the body, and (b), by the contract carrier, so that the body can be shipped by that carrier. When additional preparation of the body is required subsequent to shipment, information regarding the initial preparation of the body may be used by the mortuary services contractor to whom the body has been shipped.

Affected Public: Businesses or other for-profit and not-for-profit institutions.

Annual Burden Hours: 405.

Number of Respondents: 810.

Responses per Respondent: 1.

Annual Responses: 810.

Average Burden per Response: 0.5 hour average.

Frequency: On occasion.

Summary of Information Collection

DFARS Part 237, the clauses at DFARS 252.237–7000 and 252.237–7011, and DD Form 2063 are required for DoD contracting officers to—

(a) Verify that the apparently successful offeror for audit services is licensed by the cognizant licensing authority in the state or other political jurisdiction where the offeror operates its professional practice; or

(b) Ensure that the mortuary contractor has properly prepared the body, and by the contract carrier so that the body can be shipped by that carrier. When additional preparation of the body is required subsequent to shipment, information regarding the initial preparation of the body may be used by the mortuary services contractor to whom the body has been shipped.

Ynette R. Shelkin,

Editor, Defense Acquisition Regulations System.

[FR Doc. 2010–5735 Filed 3–15–10; 8:45 am]

BILLING CODE 5001–08–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Notice of Intent To Prepare an Environmental Impact Statement for Beddown of Training F–35A Aircraft

AGENCY: Air Education and Training Command and Air National Guard, United States Air Force.

ACTION: Revised Notice of Intent.

SUMMARY: The United States Air Force published a Notice of Intent to prepare an EIS in the **Federal Register** (Vol. 74, No. 247, page 68597) on Dec 28, 2009. Due to severe weather in New Mexico, some of the scoping meetings were cancelled. In the Air Force's effort to make every attempt to allow the public an opportunity for providing their input, we have re-scheduled the scoping meetings to be held in Ruidoso and Ft. Sumner, NM. Furthermore, due to public interest and comments, The Air Force has decided to add three additional scoping meetings in New Mexico and Arizona for the Holloman AFB and Tucson International Airport Air Guard Station alternatives. This revised Notice of Intent is prepared to notify the public of the rescheduling and additional scoping meetings to be held in New Mexico and Arizona. Also, due to these additional scoping meetings the public comment period is extended to May 17, 2010.

DATES: The Air Force intends to hold scoping meetings in the following communities:

Tucson International Airport Air Guard Station: Tuesday, March 30, 2010, at Buena High School Cafeteria, 5225 Buena School Road, Sierra Vista, Arizona; Holloman Air Force Base: Tuesday, April 13, 2010, at Best Western Stevens Inn, 1829 South Canal Street, Carlsbad, New Mexico; Wednesday, April 14, 2010 at La Quinta Inn and Suites, 200 E 19th Street, Roswell, New Mexico; Thursday, April 15, 2010 at De Baca County Courthouse Annex, 248 East Avenue C, Fort Sumner, New Mexico; Friday, April 16, 2010 at Best Western Pine Springs Inn, 1420 E Highway 70, Ruidoso, New Mexico.

The scheduled dates, times, locations and addresses for the meetings will be published in local media a minimum of 15 days prior to the scoping meetings. All meetings will be held from 5:30 p.m. to 7:30 p.m. Comments will be accepted at any time during the environmental impact analysis process. However, to ensure the Air Force has sufficient time to consider public input in the preparation of the Draft EIS, comments should be submitted to the address below by May 17, 2010.

FOR FURTHER INFORMATION CONTACT: Mr. David Martin, HQ AETC/A7CPP, 266 F Street West, Randolph AFB, TX 78150–4319, telephone 210/652–1961.

Bao-Anh Trinh,

Air Force Federal Register Liaison Officer.

[FR Doc. 2010–5666 Filed 3–15–10; 8:45 am]

BILLING CODE 5001–05–P

DEPARTMENT OF EDUCATION

Notice of Proposed Information Collection Requests

AGENCY: Department of Education.

SUMMARY: The Acting Director, Information Collection Clearance Division, Regulatory Information Management Services, Office of Management, invites comments on the proposed information collection requests as required by the Paperwork Reduction Act of 1995.

DATES: Interested persons are invited to submit comments on or before May 17, 2010.

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its statutory obligations. The Acting Director, Information Collection Clearance Division, Regulatory Information Management Services, Office of Management, publishes that notice containing proposed information collection requests prior to submission of these requests to OMB. Each proposed information collection, grouped by office, contains the following: (1) Type of review requested, e.g. new, revision, extension, existing or reinstatement; (2) Title; (3) Summary of the collection; (4) Description of the need for, and proposed use of, the information; (5) Respondents and frequency of collection; and (6) Reporting and/or Recordkeeping burden. OMB invites public comment.

The Department of Education is especially interested in public comment addressing the following issues: (1) Is this collection necessary to the proper

A.2 Cooperating Agency Letters

- U.S. Marine Corps
- Federal Aviation Administration

A.2.1 U.S. Marine Corps Letter

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

MAR 1 2010

OFFICE OF THE ASSISTANT SECRETARY

MEMORANDUM FOR DEPUTY ASSISTANT SECRETARY OF THE NAVY
(ENVIRONMENT)

FROM: SAF/IEI
1665 Air Force Pentagon
Washington, DC 20330-1665

SUBJECT: Cooperating Agency (CA) Request for the Proposed U.S. Air Force F-35A Operational and Training Beddown Environmental Impact Statements (EIS)

The Air Force requests Navy and Marine Corps formal participation in preparation of its F-35A Operational and Training Beddown EISs in accordance with the guidance in the President's Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Regulations, 40 CFR §1501.6, Cooperating Agencies.

As a cooperating agency, we request that you participate in various aspects of the EIS development as may be required. Specifically, the Air Force requests your support as a Cooperating Agency by:

a. Participating in scoping, review, and hearing processes;

b. Making staff support available to enhance interdisciplinary analysis and review;

c. Assuming responsibility, upon request, for developing information and preparing analyses on topics for which the Navy and/or Marine Corps has special expertise

Air Force staff will contact Navy and Marine Corps staffs to work our specific details of this cooperating agency relationship, however please provide your response to this request as soon as possible. Should you or your staff have further questions regarding this memo, our points of contact are Mr. Jack Bush, Bases and Units (HQ USAF/A7CIB), (703) 614-0237 and Lt Col Scott Taylor, Strategic Basing (HQ USAF/A8PB), (703) 692-1485.

Kathleen Ferguson
KATHLEEN FERGUSON, P.E.
Deputy Assistant Secretary of the Air Force
(Installations)

cc:
HQ USAF/A4/7/8
HQ USMC I&L & DC/A
HQ ACC/A5/A7
HQ AETC/A5/A7

A.2.2 U.S. Marine Corps Response Letter

DEPARTMENT OF THE NAVY

THE ASSISTANT SECRETARY OF THE NAVY
(ENERGY, INSTALLATIONS & ENVIRONMENT)
1000 NAVY PENTAGON
WASHINGTON DC 20350-1000

MAY 04 2010

MEMORANDUM FOR DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE (INSTALLATIONS)

SUBJECT: Cooperating Agency Request for the Proposed U.S. Air Force F-35A Operational and Training Beddown Environmental Impact Statement

The Department of the Navy enthusiastically accepts your March 1, 2010 invitation to participate as a Cooperating Agency in the preparation of the U.S. Air Force F-35A Operational and Training Beddown Environmental Impact Statement (EIS). As Cooperating Agency the Department of the Navy agrees to:

- Participate in scoping, review, and hearing processes;
- Make staff support available to enhance interdisciplinary analysis and review
- Assume responsibility (upon request) for developing information and preparing analyses on topics for which the Navy and/or Marine Corps has special expertise.

Our environmental planning offices will contact your designated leads for this action to further refine this cooperative agency arrangement. We value the invitation to participate as a Cooperating Agency with the United States Air Force on this very important planning effort.

Sincerely,

DONALD R. SCHREGARDUS
Deputy Assistant Secretary of the Navy
(Environment)

Copy to:
OPNAV N45
CMC (LFL)

A.2.3 Federal Aviation Administration Letter

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

OFFICE OF THE ASSISTANT SECRETARY

MAR 1 2010

SAF/IEI
1665 Air Force Pentagon
Washington, DC 20330-1665

Ms. Nancy D. LoBue
Acting Assistant Administrator for Aviation Policy, Planning and Environment
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Dear Ms. LoBue

The Air Force requests Federal Aviation Administration formal participation in preparation of its F-35A Operational and Training Beddown EISs, in accordance with the guidance in the President's Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Regulations, 40 CFR §1501.6, Cooperating Agencies. As a Cooperating Agency, we request that FAA participate in various aspects of the EIS development as may be required. Specifically, the Air Force requests your support as a Cooperating Agency by:

a. Participating in the scoping, review, and hearing processes

b. Making staff support available to enhance interdisciplinary analysis and review

c. Assuming responsibility, upon request, for developing information and preparing analyses on topics for which the FAA has special expertise

Please provide your response to this request as soon as possible. Should your staff have further questions regarding this memo, our points of contact are Mr. Jack Bush, Bases and Units (HQ USAF/A7CIB), (703) 614-0237 and Lt Col Scott Taylor, Strategic Basing (HQ USAF/A8PB), (703) 692-1485.

Kathleen I. Ferguson

KATHLEEN I. FERGUSON, P.E.
Deputy Assistant Secretary of the Air Force
(Installations)

cc:
AEE-200

U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of the Assistant Administrator for Policy,
Planning and Environment

800 Independence Avenue, SW
Washington DC, 20591

MAR 29 2010

Kathleen I. Ferguson, P.E.
Deputy Assistant Secretary of the Air Force
SAF/IEI
1665 Air Force Pentagon
Washington, DC 20330-1665

Dear Secretary Ferguson:

Thank for your letter to Nancy LoBue regarding the location of F-35A training facilities. Your letter requests the Federal Aviation Administration (FAA) formal participation in the preparation of Environmental Impact Statements (EISs) for the establishment of these facilities.

Since these facilities will be located at up to five airports, we believe the Office of Airports is in the best position to address any environmental concerns. In November 2009, a telephone conference call was held with members of the Air Force and the Office of Airports Planning and Environmental Division. At that time, the Office of Airports verbally agreed, and subsequently agreed in an email, to be a cooperating agency. That office has been coordinating with Charles J. Brown of the Air Force's Built Infrastructure.

If you have any questions or concerns, please feel free to contact Steven Urlass of my staff at 202-267-3021.

Sincerely,

Lourdes Q. Maurice
Acting Director, Office of
Environment and Energy

Cc: Ralph Thompson, APP-400

A.3 Example Interagency/Intergovernmental Coordination for Environmental Planning (IICEP) Letters

A.3.1 Federal, State, and Local Agencies Letter

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

MEMORANDUM FOR AGENCY NAME
ATTENTION: NAME
Address
City, State Zip

FROM: HQ AETC/A7C
266 F Street West
Randolph Air Force Base, Texas 78150-4319

SUBJECT: F-35A Training Environmental Impact Statement (EIS)

1. The U.S. Air Force is in the initial stages of preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess the potential environmental impacts of establishing F-35A Joint Strike Fighter training aircraft at one or more Air Force installations within the continental United States. In accordance with Executive Order, 12372, Intergovernmental Review of Federal Programs, the Air Force is requesting input from other federal, state and local agencies on the proposal.

2. The Air Force proposes to station F-35A training aircraft at any of the following locations: Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho; Eglin Air Force Base, Florida; Holloman Air Force Base, New Mexico; Luke Air Force Base, Arizona; or Tucson International Airport Air Guard Station, Arizona. The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. The EIS will address the potential effects of changes in personnel, construction of facilities and training activities in existing military airspace and ranges to support the proposed beddown of F-35A aircraft at each of the locations identified above. A no-action alternative will also be examined that does not beddown F-35A aircraft at any installation. Airspace training would include the use of defensive flare countermeasures, lasers, and supersonic flight in authorized airspace, and the use of inert or live munitions at approved military ranges. F-35A training would occur within the current military airspace and ranges of the proposed installations.

3. In support of this process we request your input in identifying general or specific issues or areas of concern you feel should be addressed in the EIS. In addition, if your agency recently completed, is currently implementing, or is planning to undertake any new activities which you believe should be included as part of our cumulative impact analysis, we ask you to identify the activity and provide a Point of Contact.

4. The Air Force's notice of intent to prepare an EIS was published in the *Federal Register* on December 28, 2009.

5. Public and agency comments received by the Air Force throughout the environmental process will be considered in the preparation of the EIS. To ensure the Air Force has sufficient time to consider public input in the preparation of the draft EIS, we are requesting that comments be submitted by March 25, 2010 to HQ AETC/A7C, 266 F Street West, Randolph Air Force Base, Texas, 78150-4319, ATTN: Mr. David Martin, AETC NEPA Project Manager.

6. If you have specific questions about the proposal, we would like to hear from you. Please contact Mr. Martin at (210) 652-1961. General questions may be directed to Master Sergeant Kevin Milliken. Sergeant Milliken can be reached at (575) 572-7381. Thank you for your assistance in this matter.

MARK A. CORRELL, Colonel, USAF
The Civil Engineer

Attachment:
Map of Potential Basing Locations

A.3.2 Bureau of Indian Affairs Letter

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

MEMORANDUM FOR BUREAU OF INDIAN AFFAIRS
ATTENTION: NAME
Address
City, State Zip

FROM: HQ AETC/A7C
266 F Street West
Randolph Air Force Base, Texas 78150-4319

SUBJECT: F-35A Operational Basing Environmental Impact Statement (EIS)

1. The U.S. Air Force is in the initial stages of preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess the potential environmental impacts of establishing F-35A Joint Strike Fighter training aircraft at any of the following locations: Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho; Eglin Air Force Base, Florida; Holloman Air Force Base, New Mexico; Luke Air Force Base, Arizona; or Tucson International Airport Air Guard Station, Arizona. The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. The EIS will address the potential effects of changes in personnel, construction of facilities and training activities in existing military airspace and ranges to support the proposed beddown of F-35A aircraft at each of the locations identified above. A no-action alternative will also be examined that does not beddown F-35A aircraft at any installation. Airspace training would include the use of defensive flare countermeasures, lasers, and supersonic flight in authorized airspace, and the use of inert or live munitions at approved military ranges. F-35A training would occur within the current military airspace and ranges of the proposed installations.

2. The Air Force's notice of intent to prepare an EIS was published in the *Federal Register* on December 28, 2009.

3. The Air Force intends to coordinate public involvement for the purpose of Section 106 review under the National Historic Preservation Act (NHPA) with public involvement in the EIS prepared under the Environmental Impact Analysis process. Meetings with public, agency, and Native American stakeholders during this scoping process will help identify the full range of reasonable alternatives, potential impacts, and key issues to be considered in the environmental impact analysis process.

4. To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft EIS, please provide information and/or comments by March 25, 2010 to HQ AETC/A7C, 266 F Street West, Randolph Air Force Base, Texas, 78150-4319, ATTN: Mr. David Martin, AETC NEPA Project Manager.

5. If you have specific questions about the proposal, we would like to hear from you. Please contact Mr. David Martin, AETC NEPA Project Manager. Mr. Martin can be reached at (210) 652-1961. Thank you for your assistance in this matter.

MARK A. CORRELL, Colonel, USAF
The Civil Engineer

Attachment:
Map of Potential Basing Locations

A.3.3 Federal, State, and Local Elected Officials Letter

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Mr. Garry B. Richey
Director of Logistics, Installation and Mission Support
Headquarters Air Education and Training Command
555 E Street East
Randolph Air Force Base, Texas 78150-4440

The Honorable Ann Kirkpatrick
U.S. House of Representatives, State of Arizona
1400 East Ash Street
Globe, Arizona 85501

Dear Representative Kirkpatrick

The U.S. Air Force is in the initial stages of preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess the potential environmental impacts of establishing F-35A Joint Strike Fighter training aircraft at any of the following locations: Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho; Eglin Air Force Base, Florida; Holloman Air Force Base, New Mexico; Luke Air Force Base, Arizona; or Tucson International Airport Air Guard Station, Arizona. The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft.

The EIS will address the potential effects of changes in personnel, construction of facilities and training activities in existing military airspace and ranges to support the proposed beddown of F-35A aircraft at each of the locations identified above. A no-action alternative will also be examined that does not beddown F-35A aircraft at any installation. Airspace training would include the use of defensive flare countermeasures, lasers and supersonic flight in authorized airspace, and the use of inert or live munitions at approved military ranges. F-35A training would occur within the current military airspace and ranges of the proposed installations.

The Air Force's notice of intent to prepare an EIS was published in the *Federal Register* on December 28, 2009.

Public and agency comments received by the Air Force throughout the environmental process will be considered in the preparation of the EIS. As part of the EIS development, the Air Force or its contractor, SAIC, may contact you in their data collection efforts. To ensure the Air Force has sufficient time to consider public input in preparation of the Draft EIS, we are requesting that comments be submitted by March 25, 2010 to HQ AETC/A7C, 266 F Street West, Randolph Air Force Base, Texas, 78150-4319, ATTN: Mr. David Martin, AETC NEPA Program Manager.

If you have specific questions about the proposal, we would like to hear from you. Please contact Mr. David Martin, AETC NEPA Project Manager. Mr. Martin can be reached at (210) 652-1961. General questions may be directed to Master Sergeant Kevin Milliken. Sergeant Milliken can be reached at (575) 572-7381. Thank you for your assistance in this matter.

Sincerely

GARRY B. RICHEY, SES

Attachment:
Map of Potential Basing Locations

A.3.4 U.S. Fish and Wildlife Service Letter (Endangered Species Act)

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

MEMORANDUM FOR U.S. FISH AND WILDLIFE SERVICE
ATTENTION: NAME
Address
City, State Zip

FROM: HQ AETC/A7C
266 F Street West
Randolph Air Force Base Texas 78150-4319

SUBJECT: F-35A Training Environmental Impact Statement (EIS)

1. The U.S. Air Force is in the preliminary stages of preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess the potential environmental impacts of establishing F-35A Joint Strike Fighter training aircraft at any of the following locations: Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho; Eglin Air Force Base, Florida, Holloman Air Force Base, New Mexico; Luke Air Force Base, Arizona; or Tucson International Airport Air Guard Station, Arizona. The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. The EIS will address the potential effects of changes in personnel, construction of facilities and training activities in existing military airspace and ranges to support the proposed beddown of F-35A aircraft at each of the locations identified above. A no-action alternative will also be examined that does not beddown F-35A aircraft at any base. Airspace training would include the use of defensive flare countermeasures, lasers, and supersonic flight in authorized airspace, and the use of inert or live munitions at approved military ranges.

2. Pursuant to analysis of the Proposed Action and to support compliance with the Endangered Species Act (ESA), we would like to request information regarding federally-listed threatened, endangered, candidate and proposed-to-be-listed species that occur or may occur in the potentially affected area. Please send this information to our SAIC contractor, Ms. Debra Barringer, at 5464 Carpinteria Avenue, Suite K, Carpinteria, California, 93013. We would appreciate you identifying a point of contact for follow-up questions. Please provide your agency comments or information regarding the Proposed Action no later than March 25, 2010, to be incorporated in the preparation of the Draft EIS.

4. The Air Force's notice of intent to produce an EIS published in the *Federal Register* on December 28, 2009.

5. Public and agency comments received by the Air Force throughout the environmental process will be considered in the preparation of the EIS.

6. If you have specific questions about the proposal, we would like to hear from you. Please contact Mr. David Martin, AETC NEPA Project Manager. Mr. Martin can be reached at (210) 652-1961. Thank you for your assistance in this matter.

MARK A. CORRELL, Colonel, USAF
The Civil Engineer

Attachment:
Map of Potential Basing Locations

A.3.5 General Letter

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

MEMORANDUM FOR ORGANIZATION/NAME
ATTENTION: NAME
Address
City, State Zip

FROM: HQ AETC/A7C
266 F Street West
Randolph Air Force Base, Texas 78150-4319

SUBJECT: F-35A Training Environmental Impact Statement (EIS)

1. The U.S. Air Force is in the initial stages of preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess the potential environmental impacts of establishing F-35A Joint Strike Fighter training aircraft at any of the following locations: Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho; Eglin Air Force Base, Florida; Holloman Air Force Base, New Mexico; Luke Air Force Base, Arizona; or Tucson International Airport Air Guard Station, Arizona. The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. The EIS will address the potential effects of changes in personnel, construction of facilities and training activities in existing military airspace and ranges to support the proposed beddown of F-35A aircraft at each of the locations identified above. A no-action alternative will also be examined that does not beddown F-35A aircraft at any installation. Airspace training would include the use of defensive flare countermeasures, lasers, and supersonic flight in authorized airspace, and the use of inert or live munitions at approved military ranges. F-35A training would occur within the current military airspace and ranges of the proposed installations.

2. The Air Force's notice of intent to prepare an EIS was published in the *Federal Register* on December 28, 2009.

3. Public and agency comments received by the Air Force throughout the environmental process will be considered in the preparation of the EIS. To ensure the Air Force has sufficient time to consider public input in the preparation of the draft EIS, we are requesting that comments be submitted by March 25, 2010 to HQ AETC/A7C, 266 F Street West, Randolph Air Force Base, Texas, 78150-4319, ATTN: Mr. David Martin, AETC NEPA Program Manager.

4. If you have specific questions about the proposal, we would like to hear from you. Please contact Mr. David Martin, AETC NEPA Project Manager. Mr. Martin can be reached at (210) 652-1961. General questions may be directed to Master Sergeant Kevin Milliken. Sergeant Milliken can be reached at (575) 572-7381. Thank you for your assistance in this matter.

MARK A. CORRELL, Colonel, USAF
The Civil Engineer

Attachment

A.4 IICEP Mailing Lists by Base

- Boise Air Terminal Airport Air Guard Station, Idaho Mailing Lists
- Holloman Air Force Base, New Mexico Mailing Lists
- Luke Air Force Base, Arizona Mailing Lists
- Tucson International Airport Air Guard Station, Arizona Mailing Lists

Table A.4–1. Boise Federal, State, and Local Agencies Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Bob	Abbey	Director	Bureau of Land Management	1849 C Street Northwest, Room 5665	Washington	D.C.	20240
Mr.	Aden	Seidlitz	District Manager	Bureau of Land Management Boise District	3948 Development Avenue	Boise	Idaho	83705
Mr.	Buddy	Green	Field Manager	Bureau of Land Management Owyhee Field Office	20 1st Avenue West	Marsing	Idaho	83639
Mr.	Tom	Dyer	State Director	Bureau of Land Management State Office	1387 South Vinnell Way	Boise	Idaho	83709
Mr.	Michael	Connor	Commissioner	Bureau of Reclamation	1849 C Street, Northwest	Washington	D.C.	20240
Mr.	Bill	McDonald	Regional Director	Bureau of Reclamation	1150 North Curtis Road, Suite 100	Boise	Idaho	83706
			Director	Federal Aviation Administration	800 Independence Ave., Southwest	Washington	D.C.	20591
Ms.	Kathryn	Vernon	Regional Administrator	Federal Aviation Administration - Northwest Mountain Region	1601 Lind Avenue, Southwest	Renton	Washington	98057
Ms.	Cayla	Morgan	Environmental Specialist	Federal Aviation Administration - Seattle Airport District Office	1601 Lind Avenue, Southwest	Renton	Washington	98057
Mr.	Jonathan	Jarvis	Director	National Park Service	1849 C Street, Northwest	Washington	D.C.	20240
Mr.	Rory	Westberg	Regional Director	National Park Service - Pacific West	1111 Jackson Street, Suite 700	Oakland	California	94607
Ms.	Debbie	Willis		United States Army Corps of Engineers - Boise Office	304 North 8th Street, Room 138	Boise	Idaho	83702
The Honorable	Ken	Salazar	Secretary	United States Department of the Interior	1849 C Street, Northwest	Washington	D.C.	20240
			Director	United States Environmental Protection Agency	1200 Pennsylvania Avenue Northwest	Washington	D.C.	20004
Ms.	Christina	Reichgott		United States Environmental Protection Agency Region 10 (ETPA-088)	1200 Sixth Avenue, Suite 900	Seattle	Washington	98101
Mr.	Larry	Koenig		Idaho Department of Environmental Quality - State Planning and Special Projects	1410 North Hilton	Boise	Idaho	83706
			Director	Idaho Fish & Game	PO Box 25	Boise	Idaho	83707
Mr.	Eric	Leitzinger	Biologist	Idaho Fish & Game - Southwest Region	3101 South Powerline Rd	Nampa	Idaho	83686
				Idaho Transportation Department - Division of Aeronautics	PO Box 7129	Boise	Idaho	83707

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Dennis	Clark		Idaho Transportation Department - Environmental Division	PO Box 7129	Boise	Idaho	83707
				Ada County Development Services	200 West Front Street	Boise	Idaho	83702
			Director	City of Boise Planning and Zoning	150 North Capitol Boulevard	Boise	Idaho	83702
Ms.	Jill	Singer		City of Boise, Boise Airport	3201 Airport Way, Suite 1000	Boise	Idaho	83705

Table A.4–2. Boise Bureau of Indian Affairs Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Stanley M.	Speaks	Regional Director	Bureau of Indian Affairs - Northwest Regional Office	911 Northeast 11th Avenue	Portland	Oregon	97232

Table A.4–3. Boise Federal, State, and Local Elected Officials Mailing List

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Walt	Minnick	Representative	U.S. House of Representatives	District 1	1517 Longworth	Washington	D.C.	20515
The Honorable	Mike	Simpson	Representative	U.S. House of Representatives	District 2	2312 Rayburn	Washington	D.C.	20515
The Honorable	Mike	Crapo	Senator	United States Senate		239 Dirksen	Washington	D.C.	20510
The Honorable	James	Risch	Senator	United States Senate		483 Russell Senate	Washington	D.C.	20510
The Honorable	Clifford R.	Bayer	Representative	Idaho House of Representatives	District 21, House Seat B	8020 West Amity	Boise	Idaho	83709
The Honorable	Maxine T.	Bell	Representative	Idaho House of Representatives	District 26, House Seat B	194 South 300 East	Jerome	Idaho	83338
The Honorable	Carlos	Bilbao	Representative	Idaho House of Representatives	District 11, House Seat B	2062 Corral Road	Emmett	Idaho	83617
The Honorable	Max C.	Black	Representative	Idaho House of Representatives	District 15, House Seat B	3731 Buckingham Drive	Boise	Idaho	83704

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Sharon L.	Block	Representative	Idaho House of Representatives	District 24, House Seat B	1093 Lakewood Drive	Twin Falls	Idaho	83301
The Honorable	Darrell	Bolz	Representative	Idaho House of Representatives	District 10, House Seat B	3412 College Avenue	Caldwell	Idaho	83605
The Honorable	Grant	Burgoyne	Representative	Idaho House of Representatives	District 16, House Seat A	2203 Mountain View Drive	Boise	Idaho	83706
The Honorable	Susan B.	Chew	Representative	Idaho House of Representatives	District 17, House Seat B	1304 Lincoln Avenue	Boise	Idaho	83706
The Honorable	Gary E.	Collins	Representative	Idaho House of Representatives	District 12, House Seat B	2019 East Massachusetts	Nampa	Idaho	83686
The Honorable	Brent	Crane	Representative	Idaho House of Representatives	District 13, House Seat A	PO Box 86	Nampa	Idaho	83653
The Honorable	Brian	Cronin	Representative	Idaho House of Representatives	District 19, House Seat B	825 East Jefferson Street	Boise	Idaho	83712
The Honorable	Branden J.	Durst	Representative	Idaho House of Representatives	District 18, House Seat A	PO Box 170117	Boise	Idaho	83717
The Honorable	Marv	Hagedorn	Representative	Idaho House of Representatives	District 20, House Seat A	5285 West Ridgeside Street	Meridian	Idaho	83646
The Honorable	Stephen	Hartgen	Representative	Idaho House of Representatives	District 23, House Seat B	1681 Wildflower Lane	Twin Falls	Idaho	83301
The Honorable	Elfreda	Higgins	Representative	Idaho House of Representatives	District 16, House Seat B	8741 West Atwater Drive	Garden City	Idaho	83714
The Honorable	Wendy	Jaquet	Representative	Idaho House of Representatives	District 25, House Seat A	PO Box 783	Ketchum	Idaho	83340
The Honorable	Richard	Jarvis	Representative	Idaho House of Representatives	District 21, House Seat A	5875 South Linder Road	Meridian	Idaho	83642
The Honorable	William M.	Killen	Representative	Idaho House of Representatives	District 17, House Seat A	734 South Coral Place	Boise	Idaho	83705

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Phylis K.	King	Representative	Idaho House of Representatives	District 18, House Seat B	2107 Palouse	Boise	Idaho	83705
The Honorable	Steve A.	Kren	Representative	Idaho House of Representatives	District 13, House Seat B	3478 South Windy Ridge Dr.	Nampa	Idaho	83686
The Honorable	Raul R.	Labrador	Representative	Idaho House of Representatives	District 14, House Seat B	1846 West Rush Road	Eagle	Idaho	83616
The Honorable	Lynn M.	Luker	Representative	Idaho House of Representatives	District 15, House Seat A	514 South El Blanco Drive	Boise	Idaho	83709
The Honorable	Mike	Moyle	Representative	Idaho House of Representatives	District 14, House Seat A	480 North Plummer Road	Star	Idaho	83669
The Honorable	Pete	Nielsen	Representative	Idaho House of Representatives	District 22, House Seat B	4303 Southwest Easy Street	Mountain Home	Idaho	83647
The Honorable	Joe	Palmer	Representative	Idaho House of Representatives	District 20, House Seat A	1524 North Meridian Road	Meridian	Idaho	83642
The Honorable	Anne	Pasley-Stuart	Representative	Idaho House of Representatives	District 19, House Seat A	749 High Point Lane	Boise	Idaho	83712
The Honorable	Jim	Patrick	Representative	Idaho House of Representatives	District 23, House Seat A	2231 East 3200 North	Twin Falls	Idaho	83301
The Honorable	Donna L.	Pence	Representative	Idaho House of Representatives	District 25, House Seat B	1960 U.S. Highway 26	Gooding	Idaho	83330
The Honorable	Robert E.	Schaefer	Representative	Idaho House of Representatives	District 12, House Seat A	PO Box 55	Nampa	Idaho	83653
The Honorable	Leon E.	Smith	Representative	Idaho House of Representatives	District 24, House Seat A	1381 Galena Dr.	Twin Falls	Idaho	83301
The Honorable	John A. "Burt"	Stevenson	Representative	Idaho House of Representatives	District 26, House Seat A	1099 North 400 West	Rupert	Idaho	83350
The Honorable	Pat	Takasugi	Representative	Idaho House of Representatives	District 10, House Seat A	17777 Allendale Road	Wilder	Idaho	83676

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Steven P.	Thayn	Representative	Idaho House of Representatives	District 11, House Seat A	5655 Hillview Road	Emmett	Idaho	83617
The Honorable	Richard	Willis	Representative	Idaho House of Representatives	District 22, House Seat A	PO Box 602	Glenns Ferry	Idaho	83623
The Honorable	John C.	Anderson	Senator	Idaho Senate	District 15	5120 North Mountain View Drive	Boise	Idaho	83704
The Honorable	Les	Bock	Senator	Idaho Senate	District 16	950 West Bannock Street, Suite 1100	Boise	Idaho	83702
The Honorable	Bert	Brackett	Senator	Idaho Senate	District 23	Flat Creek Ranch	Rogerson	Idaho	83302
The Honorable	Dean	Cameron	Senator	Idaho Senate	District 26	1101 Ruby Drive	Rupert	Idaho	83350
The Honorable	Charles	Coiner	Senator	Idaho Senate	District 24	528 Ballingrude Drive	Twin Falls	Idaho	83301
The Honorable	Tim	Corder	Senator	Idaho Senate	District 22	357 Southeast Corder Drive	Mountain Home	Idaho	83647
The Honorable	Russell M.	Fulcher	Senator	Idaho Senate	District 21	PO Box 1166	Meridian	Idaho	83680
The Honorable	Kate	Kelly	Senator	Idaho Senate	District 18	PO Box 654	Boise	Idaho	83701
The Honorable	Nicole	LeFavour	Senator	Idaho Senate	District 19	1210 North 11th	Boise	Idaho	83702
The Honorable	Patti Anne	Lodge	Senator	Idaho Senate	District 13	PO Box 96	Huston	Idaho	83630
The Honorable	John	McGee	Senator	Idaho Senate	District 10	2607 Aspen Falls Avenue	Caldwell	Idaho	83605
The Honorable	Shirley	McKague	Senator	Idaho Senate	District 20	933 East Pine	Meridian	Idaho	83642
The Honorable	Curt	McKenzie	Senator	Idaho Senate	District 12	1004 West Fort Street	Boise	Idaho	83702
The Honorable	Melinda	Smyser	Senator	Idaho Senate	District 11	26298 Lee Lane	Parma	Idaho	83660
The Honorable	Clint	Stennett	Senator	Idaho Senate	District 25	PO Box 475	Ketchum	Idaho	83340
The Honorable	Elliot	Werk	Senator	Idaho Senate	District 17	6810 Randolph Drive	Boise	Idaho	83709
The Honorable	Chuck	Winder	Senator	Idaho Senate	District 14	5528 North Ebbetts Avenue	Boise	Idaho	83713
The Honorable	Ron	Crane	State Treasurer	State of Idaho		PO Box 83720	Boise	Idaho	83720
The Honorable	Donna	Jones	State Controller	State of Idaho		PO Box 83720	Boise	Idaho	83720
The Honorable	Brad	Little	Lt. Governor	State of Idaho		State Capitol	Boise	Idaho	83720
The Honorable	Lawrence	Wasden	Attorney General	State of Idaho		PO Box 83720	Boise	Idaho	83720
The Honorable	C.L. "Butch"	Otter		Governor of Idaho		PO Box 83720	Boise	Idaho	83720

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Ben	Ysursa		Secretary of State of Idaho		PO Box 83720	Boise	Idaho	83720
The Honorable	Sharon M.	Ullman	Commissioner	Board of Commissioners of Ada County	District 1	200 West Front Street, 3rd Floor	Boise	Idaho	83702
The Honorable	Rick	Yzaguirre	Commissioner	Board of Commissioners of Ada County	District 2	200 West Front Street, 3rd Floor	Boise	Idaho	83702
The Honorable	Kathy	Alder	Commissioner	Board of Commissioners of Canyon County		1115 Albany	Caldwell	Idaho	83605
The Honorable	David	Ferdinand	Commissioner	Board of Commissioners of Canyon County		1115 Albany	Caldwell	Idaho	83605
The Honorable	Steve	Rule	Commissioner	Board of Commissioners of Canyon County		1115 Albany	Caldwell	Idaho	83605
The Honorable	Fred	Tilman	Chairman	Board of Commissioners of Ada County	District 3	200 West Front Street. 3rd Floor	Boise	Idaho	83702
The Honorable	Connie	Cruser	Commissioner	Board of Commissioners of Elmore County		150 South 4th East, Suite 3	Mountain Home	Idaho	83647
The Honorable	Larry	Rose	Commissioner	Board of Commissioners of Elmore County		PO Box 880	Glenns Ferry	Idaho	83623
The Honorable	Arlie	Shaw	Commissioner	Board of Commissioners of Elmore County		150 South 4th East, Suite 3	Mountain Home	Idaho	83647
The Honorable	Dick	Freund	Commissioner	Board of Commissioners of Owyhee County	District 3	PO Box 128	Murohy	Idaho	83650
The Honorable	Jerry	Hoagland	Commissioner	Board of Commissioners of Owyhee County	District 1	PO Box 128	Murohy	Idaho	83650
The Honorable	George	Hyer	Commissioner	Board of Commissioners of Owyhee County	District 2	PO Box 128	Murohy	Idaho	83650
The Honorable	Phil	Bandy		Mayor of Eagle		PO Box 1520	Eagle	Idaho	83616
The Honorable	David	Bieter		Mayor of Boise		PO Box 500	Boise	Idaho	83701
The Honorable	Tom	Dale		Mayor of Nampa		411 3rd Street South	Nampa	Idaho	83651
The Honorable	Tammy	de Weerd		Mayor of Meridian		33 East Broadway Avenue, Suite 300	Meridian	Idaho	83642
The Honorable	J. Scott	Dowdy		Mayor of Kuna		763 West Avalon P.O. Box 13	Kuna	Idaho	83714
The Honorable	John	Evans		Mayor of Garden City		6015 Glenwood Street	Garden City	Idaho	83714
The Honorable	Garret	Nancolas		Mayor of Caldwell		411 Blaine Street	Caldwell	Idaho	83605
The Honorable	Thomas G.	Rist		Mayor of Mountain Home		PO Box 10	Mountain Home	Idaho	83647

Table A.4–4. Boise U.S. Fish and Wildlife Service (Endangered Species Act) Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Mark	Robertson		United States Fish and Wildlife Service - Snake River Basin Office	1387 South Vinnell Way, Room 368	Boise	Idaho	83709

Table A.4–5. Boise General Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
			Librarian	Ada Community Library	Attn: Reference Material 10664 West Victory Road	Boise	Idaho	83709
			Librarian	Boise Public Library	Attn: Adult Services (Reference Material) 715 South Capitol Boulevard	Boise	Idaho	83702
			Librarian	Idaho State Library	Attn: Reference – Government Publications 325 West State Street	Boise	Idaho	83702

Table A.4–6. Holloman Federal, State, and Local Agencies Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Ms.	Janet	Carrejo	County Manager	Sierra County	100 North Date Street Suite 11	Truth or Consequences	New Mexico	87901
			Forest Supervisor	US Dept of Agriculture, Forest Service, Lincoln National Forest	1101 New York Avenue	Alamogordo	New Mexico	88310
Mr.	Ron	Curry	Cabinet Secretary	New Mexico Environment Department	1190 St Francis Drive	Santa Fe	New Mexico	87505
Ms.	Sandra	Haug	Division Director	New Mexico Dept of Energy, Minerals and Natural Resources	1220 St Francis Drive	Santa Fe	New Mexico	87505
Mr.	Bob	Sivinski		New Mexico Parks and Recreation Division Forestry Resources Conservation Division	1220 St Francis Drive	Santa Fe	New Mexico	87504-1948
Mr.	Larry	Walkoviak	Regional Director	Bureau of Reclamation Upper Colorado Regional Office	125 South State Street Room 6107	Salt Lake City	Utah	84138
Mr.	James	Burrus		Federal Aviation Administration ZAB	12701 Osito Court	Albuquerque	New Mexico	87111
Mr.	Michael	Snyder	Regional Director	National Park Service Intermountain Region	12795 Alameda Parkway	Denver	Colorado	80225

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Ms.	Karen	George		New Mexico State University Branson Library	1305 Frenger Mall	Las Cruces	New Mexico	88003
Ms.	Joyce	Stubblefield		US Environmental Protection Agency Region 6 Office of Planning and Coordination 6EN XP	1445 Ross Avenue	Dallas	Texas	75202-2733
Mr.	Tom	Baca	Aviation Director	New Mexico Aviation Division	1550 Pacheco Street	Santa Fe	New Mexico	87505-1149
Mr.	Tom	Dabbs	District Manager	Bureau of Land Management Gila District Office	1763 Paseo San Luis	Sierra Vista	Arizona	85635
Mr.	Brian	Haines	County Manager	Dona Ana County	180 West Amador	Las Cruces	New Mexico	88001
Mr.	Bill	Childress	District Manager	Bureau of Land Management Las Cruces District Office	1800 Marquess Street	Las Cruces	New Mexico	88005
Mr.	Dan	Wenk	Director	National Park Service	1849 C Street Northwest	Washington	D.C.	20240
Mr.	Michael	Connor	Commissioner	Bureau of Reclamation	1849 C Street Northwest	Washington	D.C.	20240
Mr.	Bob	Abbey	Director	Bureau of Land Management	1849 C Street Northwest Room 5665	Washington	D.C.	20240
Mr.	Ken	Salazar	Secretary	US Department of the Interior	1849 C Street Northwest	Washington	D.C.	20240
Mr.	Roy	Hayes	Supervisor	New Mexico Dept of Game & Fish SE Area Office	1912 West Second Street	Roswell	New Mexico	88201
Mr.	Clyde	Dehart	ASW-900/AF Representative	Federal Aviation Administration Southwest Region	2601 Meachem Boulevard	Fort Worth	Texas	76193-0001
Ms.	Nan	Terry		Federal Aviation Administration	2601 Meachem Boulevard	Fort Worth	Texas	76137
Ms.	Teresa	Bruner	Regional Administrator	Federal Aviation Administration Southwest Region	2601 Meachem Boulevard	Fort Worth	Texas	76137
Ms.	Lacey	Spriggs	ASW-640 Branch Manager	Federal Aviation Administration Southwest Region	2601 Meachem Boulevard	Fort Worth	Texas	76137
Mr.	Luis	Rios	Supervisor	New Mexico Dept of Game & Fish SW Area Office	2715 Northrise Drive	Las Cruces	New Mexico	88011
Mr.	Doug	Burger	District Manager	Bureau of Land Management Pecos District Office	2909 W Second Street	Roswell	New Mexico	88201
Mr.	Chuck	Schmidt	Field Manager	Bureau of Land Management Roswell Field Office	2909 W Second Street	Roswell	New Mexico	88201
Mr.	John	Hummer	Commissioner	New Mexico Dept of Transportation District 1	2912 East Pine Street	Deming	New Mexico	88030

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Frank	Guzman	District Engineer	New Mexico Dept of Transportation District 1	2912 East Pine Street	Deming	New Mexico	88030
Ms.	Tania	Proctor	Human Resources Director	Village of Ruidoso	313 Cree Meadows Drive	Ruidoso	New Mexico	88345-6939
			Regional Forester	US Department of Agriculture, Forest Service	333 Broadway Southeast	Albuquerque	New Mexico	87102
Ms.	P. Carol	Schlarb	Town Clerk	Town of Carrizozo	400 9th Street	Carrizozo	New Mexico	88301
Mr.	Ed	Singleton	District Manager	Bureau of Land Management Albuquerque District Office	435 Montano Road Northeast	Albuquerque	New Mexico	87107
Mr.	John	Poland	Area Manager	Bureau of Reclamation Albuquerque Area Office	555 Broadway Northeast Suite 100	Albuquerque	New Mexico	87102
Ms.	Carol	Erwin	Area Manager	Bureau of Reclamation Phoenix Area Office	6150 West Thunderbird Road	Glendale	Arizona	85306
Mr.	Scott	Cooke	Field Manager	Bureau of Land Management Safford Field Office	711 14th Avenue	Safford	Arizona	85546
Mr.	John	McElroy	District Engineer	New Mexico Dept of Transportation District 5	7315 Cerrillos Road PO Box 4127	Santa Fe	New Mexico	87592
Ms.	Nancy	Kalinowski		Federal Aviation Administration System Operations and Safety	800 Independence Avenue Room 400E	Washington	D.C.	20591
Mr.	J Randolph	Babbitt	Administrator	Federal Aviation Administration	800 Independence Avenue Southwest	Washington	D.C.	20591
Mr.	John	Semanek		Federal Aviation Administration	8000 Louisiana Blvd Northeast	Albuquerque	New Mexico	87109
Ms.	Clinette	Hosier		Federal Aviation Administration	8000 Louisiana Boulevard Northeast	Albuquerque	New Mexico	87109
			Regional Director	New Mexico Farm and Livestock	89 Las Flores Drive	Roswell	New Mexico	88203
Ms.	Danita	Burns	Field Manager	Bureau of Land Management Socorro Field Office	901 S Highway 85	Socorro	New Mexico	87801
Dr.	Miley	Gonzales	Secretary of Agriculture	New Mexico Department of Agriculture	Box 30005 Department 3189	Las Cruces	New Mexico	88003-8005
Mr.	Galen	Hanson	Facility Manger	Bureau of Reclamation Elephant Butte Field Division	HC32 Box 312	Truth or Consequences	New Mexico	87901
Mr.	Jim	Kenna	State Director	Bureau of Land Management Arizona Office	One North Central Avenue Suite 800	Phoenix	Arizona	85004
Mr.	Wes	Able	Facilities Coordination Specialist	Bureau of Reclamation Carlsbad Office	PO Box 1356	Carlsbad	New Mexico	88221
Mr.	Johnny	Cope	Commissioner Chair	New Mexico Dept of Transportation District 2	PO Box 1457	Roswell	New Mexico	88202

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Gary	Shubert	District Engineer	New Mexico Dept of Transportation District 2	PO Box 1457	Roswell	New Mexico	88202
Mr.	Stephen	Spencer	Environmental Officer	US Department of Interior, Office of Secretary, Regional Environmental Office	PO Box 26567 MC9	Albuquerque	New Mexico	87125-6569
Ms.	Linda	Rundell	State Director	Bureau of Land Management New Mexico State Office	PO Box 27115	Santa Fe	New Mexico	87502
Mr.	Bobby	Clark	Manager	Bureau of Reclamation Socorro Field Division	PO Box VV	Socorro	New Mexico	87801
Mr.	Cliff	Spencer	Park Superintendent	White Sands National Monument	PO Box 1086	Holloman AFB	New Mexico	88330
			Director	New Mexico Department of Parks and Recreation	PO Box 1147	Santa Fe	New Mexico	87501
Mr.	Patrick	Lyons	Commissioner	New Mexico State Land Office	PO Box 1148	Santa Fe	New Mexico	87504-1148
Mr.	Jackson	Gibson	Commissioner	New Mexico Dept of Transportation District 6	PO Box 2160	Milan	New Mexico	87021
Mr.	Larry	Maynard	District Engineer	New Mexico Dept of Transportation District 6	PO Box 2160	Milan	New Mexico	87021
Mr.	Tod	Stevenson	Director	New Mexico Dept of Game & Fish	PO Box 25112	Santa Fe	New Mexico	87507
Mr.	Matt	Wunder	Division Chief	New Mexico Dept of Game & Fish, Conservation Services Division	PO Box 25112	Santa Fe	New Mexico	87507
Mr.	Roman	Maes	Commissioner	New Mexico Dept of Transportation District 5	PO Box 4127	Santa Fe	New Mexico	87592
Ms.	Lorri	Gray-Lee	Regional Director	Bureau of Reclamation Lower Colorado Regional Office	PO Box 61470	Boulder City	Nevada	89006
Ms.	Nancy	Skinner	Chief	National Park Service	PO Box 728	Santa Fe	New Mexico	87504
Ms.	Matejka	Ray-Olguin	County Manager	Socorro County	PO Box I	Socorro	New Mexico	87801
Dr.	Kristine	Johnson	Director	New Mexico State Heritage Program	University of New Mexico Biology Dept MSC03 2020 1	Albuquerque	New Mexico	87131

Table A.4–7. Holloman Bureau of Indian Affairs Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Jerold	Gidner	Director	Bureau of Indian Affairs	MS4606 1849 C Street Northwest	Washington	D.C.	20240
Mr.	Omar	Bradley	Regional Director	Bureau of Indian Affairs Navajo Regional Agency	PO Box 1060	Gallup	New Mexico	87305

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Ms.	Effie	Delmar	Natural Resources Manager	Bureau of Indian Affairs Navajo Region Eastern Navajo Agency	PO Box 328	Crownpoint	New Mexico	87313
Mr.	Calvert	Curley	Natural Resources Manager	Bureau of Indian Affairs Navajo Region Ft Defiance Agency	PO Box 7H	Ft Defiance Agency	Arizona	86504
			Superintendent	Bureau of Indian Affairs Southwest Region Mescalero Agency	PO Box 189	Mescalero	New Mexico	88340
			Superintendent	Bureau of Indian Affairs Southwest Region Ramah Navajo Agency	HC16 Box 14	Ramah	New Mexico	87321
Mr.	Bill	Walker	Acting Regional Director	Bureau of Indian Affairs Southwest Regional Office	1001 Indian School Road Northwest	Albuquerque	New Mexico	87104

Table A.4–8. Holloman Federal, State, and Local Elected Officials Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
The Honorable	Jeff	Bingaman	Senator	United States Senate	148 Loretto Towne Centre 505 South Main Suite 148	Las Cruces	New Mexico	88001
The Honorable	Tom	Udall	Senator	United States Senate	505 South Main Suite 118	Las Cruces	New Mexico	88001
The Honorable	Ann	Kirkpatrick	Representative	U.S. House of Representatives	1400 East Ash Street	Globe	Arizona	85501
The Honorable	Ann	Kirkpatrick	Representative	U.S. House of Representatives	550 North 9th Place	Show Low	Arizona	85901
The Honorable	Harry	Teague	Representative	US House of Representatives	135 West Griggs	Las Cruces	New Mexico	88011
The Honorable	Jack A.	Brown	Representative	Arizona House of Representatives	1700 West Washington Room 316	Phoenix	Arizona	85007
The Honorable	Bill	Konopnicki	Representative	Arizona House of Representatives	1700 West Washington Room 219	Phoenix	Arizona	85007
The Honorable	Barbara	McGuire	Representative	Arizona House of Representatives	1700 West Washington Room 322	Phoenix	Arizona	85007
The Honorable	Frank	Pratt	Representative	Arizona House of Representatives	1700 West Washington Room 115	Phoenix	Arizona	85007
The Honorable	Sylvia	Allen	Senator	Arizona State Senate	1700 West Washington Room 307	Phoenix	Arizona	85007
The Honorable	Rebecca	Rios	Senator	Arizona State Senate	1700 West Washington Room 213	Phoenix	Arizona	85007
The Honorable	Jose A.	Campos	Representative	New Mexico House of Representatives	1050 South 10th Street	Santa Rosa	New Mexico	88435
The Honorable	Zachary	Cook	Representative	New Mexico House of Representatives	100 Sarah Lane	Ruidoso	New Mexico	88435

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
The Honorable	Nathan P	Cote	Representative	New Mexico House of Representatives	15475 Space Murals Lane	Las Cruces	New Mexico	88011
The Honorable	Nora	Espinoza	Representative	New Mexico House of Representatives	608 Golondrina	Roswell	New Mexico	88201
The Honorable	Candy Spence	Ezzell	Representative	New Mexico House of Representatives	Box 2125	Roswell	New Mexico	88202
The Honorable	Keith J.	Gardner	Representative	New Mexico House of Representatives	4500 Verde Drive	Roswell	New Mexico	88201
The Honorable	William	Gray	Representative	New Mexico House of Representatives	1503 West Dallas Avenue	Artesia	New Mexico	88210
The Honorable	Rhonda	King	Representative	New Mexico House of Representatives	PO Box 6	Stanley	New Mexico	87056
The Honorable	Dennis	Kintigh	Representative	New Mexico House of Representatives	1205 San Juan Drive	Roswell	New Mexico	88201
The Honorable	Dianne	Miller Hamilton	Representative	New Mexico House of Representatives	4132 North Gold Street	Silver City	New Mexico	88061
The Honorable	Don	Tripp	Representative	New Mexico House of Representatives	PO Box 1369	Socorro	New Mexico	87801
The Honorable	Gloria	Vaughn	Representative	New Mexico House of Representatives	503 East 16th Street	Alamogordo	New Mexico	88310
The Honorable	Richard	Vigil	Representative	New Mexico House of Representatives	PO Box 456	Ribera	New Mexico	87560
The Honorable	Rod	Adair	Senator	New Mexico Senate	PO Box 1796	Roswell	New Mexico	88202
The Honorable	Vernon	Asbill	Senator	New Mexico Senate	1502 Mountain Shadow	Carlsbad	New Mexico	88220
The Honorable	Pete	Campos	Senator	New Mexico Senate	500 Raynolds Avenue	Las Vegas	New Mexico	87701
The Honorable	Dianna	Duran	Senator	New Mexico Senate	909 8th Street	Tularosa	New Mexico	88352
The Honorable	Stephen H.	Fischmann	Senator	New Mexico Senate	PO Box 2580	Mesilla Park	New Mexico	88047
The Honorable	Mary Jane	Garcia	Senator	New Mexico Senate	PO Box 22	Dona Ana	New Mexico	88032
The Honorable	Clinton D.	Harden	Senator	New Mexico Senate	1348 CRH	Clovis	New Mexico	88101
The Honorable	Stuart	Ingle	Senator	New Mexico Senate	2106 West University Drive	Portales	New Mexico	88130
The Honorable	Timothy Z.	Jennings	Senator	New Mexico Senate	PO Box 1797	Roswell	New Mexico	88202
The Honorable	Gay	Kernan	Senator	New Mexico Senate	928 W Mesa Verde	Hobbs	New Mexico	88240
The Honorable	Howie C.	Morales	Senator	New Mexico Senate	4285 North Swan	Silver City	New Mexico	88061
The Honorable	Cynthia	Nava	Senator	New Mexico Senate	3002 Broadmoor	Las Cruces	New Mexico	88001
The Honorable	Mary Kay	Papen	Senator	New Mexico Senate	904 Conway Avenue	Las Cruces	New Mexico	88005
The Honorable	John Arthur	Smith	Senator	New Mexico Senate	PO Box 998	Deming	New Mexico	88031
The Honorable	David	Ulibarri	Senator	New Mexico Senate	1629 Chaco	Grants	New Mexico	87020

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
The Honorable	Bill	Richardson	Governor	State of New Mexico Office of the Governor	State Capital Building	Santa Fe	New Mexico	87503
Ms.	LouAnn	Foster		Alamogordo City Manager	1376 East 9th Street	Alamogordo	New Mexico	88310
Mr.	Matt	McNeile		Alamogordo City Manager	1376 East 9th Street	Alamogordo	New Mexico	88310
Mr.	Mark	Roath		Alamogordo City Manager	1376 East 9th Street	Alamogordo	New Mexico	88310
Ms.	Maureen	Schmittle		Alamogordo City Manager	1376 East 9th Street	Alamogordo	New Mexico	88310
The Honorable	Loyd Allen	Lambert	Commissioner	Catron County	PO Box 507	Reserve	New Mexico	87830
The Honorable	Hugh B.	McKeen	Commissioner	Catron County	PO Box 507	Reserve	New Mexico	87830
The Honorable	Francis Edward	Wehrheim	Commissioner	Catron County	PO Box 507	Reserve	New Mexico	87830
The Honorable	Kim	Chesser	Commissioner	Chaves County	PO Box 1817	Roswell	New Mexico	88202
The Honorable	Greg	Nibert	Commissioner	Chaves County	PO Box 1817	Roswell	New Mexico	88202
The Honorable	Richard	Taylor	Commissioner	Chaves County	PO Box 1817	Roswell	New Mexico	88202
The Honorable	Michael	Trujillo	Commissioner	Chaves County	PO Box 1817	Roswell	New Mexico	88202
The Honorable	Kyle	Wooton	Commissioner	Chaves County	PO Box 1817	Roswell	New Mexico	88202
Mr.	Arthur	Alterson		City of Alamogordo	1376 East 9th Street	Alamogordo	New Mexico	88310
The Honorable	Ron	Griggs	Mayor	City of Alamogordo	1376 East 9th Street	Alamogordo	New Mexico	88310
The Honorable	Manuel	Madrid	Mayor	City of Artesia	PO Box 1310	Artesia	New Mexico	88211
The Honorable	Steve	Sederwall	Mayor	City of Capitan	PO Box 246	Capitan	New Mexico	88316
The Honorable	Bob	Forrest	Mayor	City of Carlsbad	101 North Halagueno	Carlsbad	New Mexico	88221
The Honorable	Bob	Barnes	Mayor	City of Elephant Butte	PO Box 1080	Elephant Butte	New Mexico	87935
The Honorable	Judd	Nordyke	Mayor	City of Hatch	PO Box 250	Hatch	New Mexico	87937
The Honorable	Bill	Mattiace	Mayor	City of Las Cruces	200 North Church Street	Las Cruces	New Mexico	88001
The Honorable	Bill	Owen	Mayor	City of Roswell	425 North Richardson Avenue	Roswell	New Mexico	88201
The Honorable	Bob	Miller	Mayor	City of Ruidoso Downs	PO Box 348	Ruidoso Downs	New Mexico	88346
The Honorable	Ravi	Bhasker	Mayor	City of Socorro	PO Box K 111 School of Mines Road	Socorro	New Mexico	87801
The Honorable	Jimmy	Rainey	Mayor	City of Truth or Consequences	505 Sims Street	Truth or Consequences	New Mexico	87901
The Honorable	Frank	Blackburn	Commissioner	Curry County	700 North Main Street	Clovis	New Mexico	88101
The Honorable	Wendell	Bostwick	Commissioner	Curry County	700 North Main Street	Clovis	New Mexico	88101
The Honorable	Caleb	Chandler	Commissioner	Curry County	700 North Main Street	Clovis	New Mexico	88101
The Honorable	Robert	Sandoval	Commissioner	Curry County	700 North Main Street	Clovis	New Mexico	88101
The Honorable	Daniel	Stoddard	Commissioner	Curry County	700 North Main Street	Clovis	New Mexico	88101

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
The Honorable	George	Gonzales	Commissioner	De Baca County	PO Box 347	Fort Sumner	New Mexico	88119
The Honorable	Tommy	Roybal	Commissioner	De Baca County	PO Box 347	Fort Sumner	New Mexico	88119
The Honorable	Joe	Steele	Commissioner	De Baca County	PO Box 347	Fort Sumner	New Mexico	88119
The Honorable	Leticia	Duarte-Benavidez	Commissioner	Doña Ana County	845 North Motel Blvd	Las Cruces	New Mexico	88007
The Honorable	Scott	Krahling	Commissioner	Doña Ana County	845 North Motel Blvd	Las Cruces	New Mexico	88007
The Honorable	Karen	Perez	Commissioner	Doña Ana County	845 North Motel Blvd	Las Cruces	New Mexico	88007
The Honorable	Dolores	Saldaña-Caviness	Commissioner	Doña Ana County	845 North Motel Blvd	Las Cruces	New Mexico	88007
The Honorable	Oscar	Vasquez-Butler	Commissioner	Doña Ana County	845 North Motel Blvd	Las Cruces	New Mexico	88007
The Honorable	Lewis	Derrick	Commissioner	Eddy County	101 West Greene Street Suite 225	Carlsbad	New Mexico	88220
The Honorable	Tony	Hernandez	Commissioner	Eddy County	101 West Greene Street Suite 225	Carlsbad	New Mexico	88220
The Honorable	Roxanne	Lara	Commissioner	Eddy County	101 West Greene Street Suite 225	Carlsbad	New Mexico	88220
The Honorable	Guy	Lutman	Commissioner	Eddy County	101 West Greene Street Suite 225	Carlsbad	New Mexico	88220
The Honorable	John	Volpato	Commissioner	Eddy County	101 West Greene Street Suite 225	Carlsbad	New Mexico	88220
The Honorable	Tom	Battin	Commissioner	Lincoln County	PO Box 711	Carrizozo	New Mexico	88301
The Honorable	Dave	Parks	Commissioner	Lincoln County	PO Box 711	Carrizozo	New Mexico	88301
The Honorable	Jackie	Powell	Commissioner	Lincoln County	PO Box 711	Carrizozo	New Mexico	88301
The Honorable	Eileen	Sedillo	Commissioner	Lincoln County	PO Box 711	Carrizozo	New Mexico	88301
Mr.	Tom	Stewart		Lincoln County	300 Central Avenue	Carrizozo	New Mexico	88301
The Honorable	Donald	Williams	Commissioner	Lincoln County	PO Box 711	Carrizozo	New Mexico	88301
The Honorable	Clarissa	McGinn	Commissioner	Otero County Commission	1101 New York Avenue Room 101	Alamogordo	New Mexico	88310
The Honorable	Doug	Moore	Commissioner	Otero County Commission	1101 New York Avenue Room 101	Alamogordo	New Mexico	88310
The Honorable	Ronny	Rardin	Commissioner	Otero County Commission	1101 New York Avenue Room 101	Alamogordo	New Mexico	88310
The Honorable	Bill	Cathey	Commissioner	Roosevelt County	109 West 1st Street	Portales	New Mexico	88130
The Honorable	Gene	Creighton	Commissioner	Roosevelt County	109 West 1st Street	Portales	New Mexico	88130
The Honorable	Paul	Grider	Commissioner	Roosevelt County	109 West 1st Street	Portales	New Mexico	88130
The Honorable	Jake	Lopez	Commissioner	Roosevelt County	109 West 1st Street	Portales	New Mexico	88130

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
The Honorable	David	Sanders	Commissioner	Roosevelt County	109 West 1st Street	Portales	New Mexico	88130
The Honorable	Walter	Armijo	Commissioner	Sierra County	100 North Date Street	Truth or Consequences	New Mexico	87901
The Honorable	Alvin	Campbell	Commissioner	Sierra County	100 North Date Street	Truth or Consequences	New Mexico	87901
The Honorable	James	Coslin	Commissioner	Sierra County	100 North Date Street	Truth or Consequences	New Mexico	87901
The Honorable	Phillip	Anaya	Commissioner	Socorro County	PO Box I	Socorro	New Mexico	87801
The Honorable	Rumaldo	Griego	Commissioner	Socorro County	PO Box I	Socorro	New Mexico	87801
The Honorable	Juan	Gutierrez	Commissioner	Socorro County	PO Box I	Socorro	New Mexico	87801
The Honorable	Daniel	Monette	Commissioner	Socorro County	PO Box I	Socorro	New Mexico	87801
The Honorable	Rosalind	Tripp	Commissioner	Socorro County	PO Box I	Socorro	New Mexico	87801
The Honorable	Paul	Chavez	Commissioner	Torrance County	PO Box 48	Estancia	New Mexico	87016
The Honorable	Vanessa	Chavez-Gutierrez	Commissioner	Torrance County	PO Box 48	Estancia	New Mexico	87016
The Honorable	Jim	Frost	Commissioner	Torrance County	PO Box 48	Estancia	New Mexico	87016
The Honorable	Manuel	Hernandez	Mayor	Town of Carrizozo	400 9th Street	Carrizozo	New Mexico	88301
The Honorable	Michael	Cadena	Mayor	Town of Mesilla	PO Box 10	Mesilla	New Mexico	88046
The Honorable	Velta	Gilley	Mayor	Town of Mountainair	107 North Roosevelt Avenue	Mountainair	New Mexico	87036
The Honorable	David C	Venable	Mayor	Village of Cloudcroft	PO Box 554	Cloudcroft	New Mexico	88317
The Honorable	Gilbert	Stewart, Jr.	Mayor	Village of Corona	PO Box 37	Corona	New Mexico	88318
The Honorable	Juan	Chavez	Mayor	Village of Fort Sumner	PO Box 180	Fort Sumner	New Mexico	88119
The Honorable	John	Collins	Mayor	Village of Hope	PO Box 1476	Hope	New Mexico	88250
The Honorable	L. Ray	Nunley	Mayor	Village of Ruidoso	PO Box 459	Ruidoso	New Mexico	88355
The Honorable	Demeterio	Montoya	Mayor	Village of Tularosa	705 St Francis Drive	Tularosa	New Mexico	88352
The Honorable	Carol Sue	Jackson	Mayor	Village of Williamsburg	PO Box 150	Williamsburg	New Mexico	87942

Table A.4–9. Holloman U.S. Fish and Wildlife Service (Endangered Species Act) Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Steve	Helfert	DoD Liaison	United States Fish & Wildlife Service	500 Gold Avenue Southwest	Albuquerque	New Mexico	87102
			Refuge Manager	United States Fish & Wildlife Service San Andres NWR	PO Box 756	Las Cruces	New Mexico	88004

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Eric	Hein	Acting Field Supervisor	United States Fish and Wildlife Service New Mexico Ecological Services	2105 Osuna Northeast	Albuquerque	New Mexico	87113
Dr.	Benjamin	Tuggle	Regional Director	United States Fish and Wildlife Service Region 2	PO Box 1306	Albuquerque	New Mexico	87103-1306

Table A.4–10. Holloman General Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Thom	Rennie		Air Force Center for Environmental Excellence	Regional Environmental Office 525 S Griffin Street Suite 505	Dallas	Texas	75202
Brigadier General	John	Regan		Department of the Army US Army Garrison	100 HQ Avenue Building 163 IMSW-WSM-PW-E-C	White Sands Missile Range	New Mexico	88002-5000
Mr.	Ned	Farquhar	NM SPOC	Energy and Environmental Policy Advisor	State Capitol Building Suite 400	Santa Fe	New Mexico	87501
Mr.	Peter	Bullock	NEPA Customer Support Div	Environment and Safety Directorate	WSM-ES-C	White Sands Missile Range	New Mexico	88002-5000
Brigadier General, USAF (Ret)	Hanson	Scott	Director	Office of Military Base Planning & Support	Joseph M Montoya Building 1100 St Francis Drive Room 1060	Santa Fe	New Mexico	87505
Brigadier General	Jay	Bledsoe			2251 Air Guard Rd Southeast	Albuquerque	New Mexico	87117
Mr.	Norm	Arnold		Alomo Forum	401 Boyce Avenue	Alamogordo	New Mexico	88310
Mr.	Ed	Brabson		Committee of 50	802 10th Street	Alamogordo	New Mexico	88310-6474
Mr.	Bill	Burt		Committee of 50	PO Box 1848	Alamogordo	New Mexico	88311
Mr.	Charles	Ferrell	Chair	Committee of 50	PO Box 550	Tularosa	New Mexico	88352
Mr.	John	Gardiner		Committee of 50	788 Washington Avenue	Alamogordo	New Mexico	88310
Mr.	Andrew	Riggs		Committee of 50	143 South New York	Alamogordo	New Mexico	88310
Ms.	Anita	Powell	President	Lincoln County Bird Club	100 Mountain View Drive	Ruidoso	New Mexico	88345
Ms.	Kateri	Cewarter		Mescalero	PO Box 126	Bent	New Mexico	88314
Ms.	Crystal	Melendrez		Mescalero Apache Boys & Girls Club	PO Box 227	Mescalero	New Mexico	88340
Mr.	William	Magoosh		Mescalero Elderly Program	PO Box 227	Mescalero	New Mexico	88340
Mr.	Gill M	Sorg	President	Mesilla Valley Audubon Society	PO Box 1645	Las Cruces	New Mexico	88004
				National Technical Information Service	5285 Port Royal Road	Springfield	Virginia	22151-2103

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
				Natural Resources Conservation Service	6200 Jefferson NE	Albuquerque	New Mexico	87109-3734
Mr.	Frederick	Kanesewah			PO Box 288	Mescalero	New Mexico	88340
Ms.	Jennifer	Smith			PO Box 1244	Cloudcroft	New Mexico	88317
Mr.	Ed	Carr		Alamogordo Chamber	1301 N White Sands	Alamogordo	New Mexico	88310
			Executive Director	Anthony Chamber of Commerce	PO Box 1086	Anthony	New Mexico	88021
Mr.	Richard	Price	Executive Director	Artesia Chamber of Commerce	408 W Texas PO Box 99	Artesia	New Mexico	88210
			Executive Director	Capitan Chamber of Commerce	PO Box 441	Capitan	New Mexico	88316
			Executive Director	Carlsbad Chamber of Commerce	PO Box 910	Carlsbad	New Mexico	88220
			Executive Director	Carrizozo Chamber of Commerce	PO Box 567	Carrizozo	New Mexico	88301
Mr.	Jason	Baldwin	Director	Cloudroft Chamber of Commerce	PO Box 1290	Cloudcroft	New Mexico	88317
Mr.	Bob	Owen	President	Elephant Butte Chamber of Commerce	PO Box 1355	Elephant Butte	New Mexico	87935
			Executive Director	Hatch Chamber of Commerce	PO Box 38	Hatch	New Mexico	87937
Mr.	Fred	Mobley	Chair	Las Cruces Chamber of Commerce	PO Drawer 519	Las Cruces	New Mexico	88004
Ms.	Dorothy	Cole	President	Mountainair Chamber of Commerce	PO Box 595	Mountainair	New Mexico	87036
Mr.	Brad	Treptow	Executive Director	Ruidoso Chamber of Commerce	720 Suddreth Drive	Ruidoso	New Mexico	88345
			Executive Director	Socorro Chamber of Commerce	PO Box 743	Socorro	New Mexico	87801
			Executive Director	Truth or Consequences Chamber of Commerce	PO Box 31	Truth or Consequences	New Mexico	87901
			Executive Director	Tularosa Chamber of Commerce	301 Central	Tularosa	New Mexico	88352
Mr.	Richard	Coltharp		Alamogordo Daily News	518 24th Street	Alamogordo	New Mexico	88310-6104
Ms.	Elva	Osterreich		Alamogordo Daily News	518 24th Street	Alamogordo	New Mexico	88310-6104
Mr.	Mark	McColl		Burt Broadcasting	862 Hermoso El Sol	Alamogordo	New Mexico	88310-7799
Mr.	Charles	Foster		Dyn Corp	45 Cielo Montana	Alamogordo	New Mexico	88310-9547

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	David	Garcia		Dyn Corp	1304 17th	Alamogordo	New Mexico	88310-5724
Mr.	Michael	Zaragoza		Dyn Corp	404 Sundown Avenue	Alamogordo	New Mexico	88310
Mr.	Robert	Wilson		Dyn International	3026 Eldorado	Alamogordo	New Mexico	88310
Ms.	Shannan T	Wright	President	General Hydronics Inc	1001 Zuni Drive	Alamogordo	New Mexico	88311
Dr.	Arthur	Austin		Gerald Champion Regional Medical Center	46 High Sierra Drive	Alamogordo	New Mexico	88310
Mr.	John	Wheeler		John Wheeler & Associates	PO Box 1810	Alamogordo	New Mexico	88311
Mr.	Scott	Goldmar		Mesa Verde Enterprises	PO Box 907	Alamogordo	New Mexico	88311
Mr.	Bill	Williams		RUI	1096 Mechem Suite 226	Ruidoso	New Mexico	88345
Ms.	Linda	Gulley		State Farm Insurance	101 North White Sands Boulevard	Alamogordo	New Mexico	88310
Mr.	Norm	Arnold		Super 8 Motel	401 Boyce	Alamogordo	New Mexico	88310
Mr.	Harold	Oakes		Walton Stations	1096 Mechem Suite 230	Ruidoso	New Mexico	88345
Ms.	Carolyn Dawn	Provencher		Candidate for House Seat 56	PO Box 298	La Luz	New Mexico	88337
Mr.	Charles	Marble		CIV	2363 Nevada Drive	Alamogordo	New Mexico	88310-3702
Mr.	Sid	Alford			PO Box 171	Glencoe	New Mexico	88324
Mr.	Robert	Brennan			2506 East Ridge	Alamogordo	New Mexico	88310-4434
Mr. & Mrs.	Guillermo & Pamela	Chamberlain			PO Box 420	Timberon	New Mexico	88350
Mr.	Walt	Coffman			PO Box 425	Weed	New Mexico	88354
Ms.	Cynthia	Culbertson			PO Box 688	Carrizozo	New Mexico	88301
Ms.	Leighton	Davis			PO Box 729	Alto	New Mexico	88312
Ms.	Aubrey	Dunn			PO Box 386	Alamogordo	New Mexico	88311-0386
Mr.	Tommy	French			2206 Casa Bonita	Alamogordo	New Mexico	88311
Mr.	Manuel	Gonzales			PO Box 1989	Alamogordo	New Mexico	88311
Mr. & Mrs.	Lance and Brittany	Grace			44 Marble Canyon Estates	Alamogordo	New Mexico	88310
Mr.	Toots	Green			1019 Canyon Road	Alamogordo	New Mexico	88310-3622
Mr.	Michael	Johnson			PO Box 218	Timberon	New Mexico	88350
Mr.	John	Marquardt			3150 Hamilton Rd	Alamogordo	New Mexico	88310-9516

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Robert	Martinez			46 Marble Canyon	Alamogordo	New Mexico	88310
Mr.	James	Pigg			4851 Quail Run	Las Cruces	New Mexico	88011
Mr.	Pete	Sarmiento			PO Box 2003	Ruidoso	New Mexico	88355
Mr.	Todd	Sherman			PO Box 953	Holloman AFB	New Mexico	88330
Ms.	Ellen	Wedum			PO Box 1086	Cloudcroft	New Mexico	88317
Mr.	Brent	Hart		Aircraft Owners and Pilots Association	421 Aviation Way	Fredrick	Maryland	21701-4798
Mr.	Rudy	Clark	Manager	Alamogordo Airport	1376 E 9th Street	Alamogordo	New Mexico	88310
Mr.	Brian	Denmark		Las Cruces International Airport	1501 E Hadley Building D	Las Cruces	New Mexico	88001
Mr.	Thomas	Wylam	Airport Director	Sierra Blanca Regional Airport	313 Cree Meadows Drive	Ruidoso	New Mexico	88345
Mr.	Pat	Salome		Socorro Airport	PO Box K	Socorro	New Mexico	87801
				Truth or Consequences Airport	505 Sims Street	Truth or Consequences	New Mexico	87901
Mr.	Chuck	Huber		United States Pilots Association	483 S Kirkwood Road Ste 10	St Louis	Missouri	63122
Ms.	Jennifer	Brady	Roswell Airport Contact		1 Jerry Smith Circle	Roswell	New Mexico	88203
Mr.	Paul	Miller		Alamogordo Public Library	920 Oregon	Alamogordo	New Mexico	88310
			Librarian	Artesia Public Library	306 West Richardson	Artesia	New Mexico	88210
			Senior Reference Librarian	Branigan Memorial Library	200 East Picacho	Las Cruces	New Mexico	88001
Ms.	Ellen	Harbaugh	Library Director	Carlsbad Municipal Library	101 S Halagueno	Carlsbad	New Mexico	88220
			Librarian	Cloudcroft Library	30 Swallow Pl	Cloudcroft	New Mexico	88317
			Library	Dona Ana Community College	3400 South Espina	Las Cruces	New Mexico	88003
			Library	El Paso Community College Northwest Center	6701 South Desert Boulevard	El Paso	Texas	79835
			Library	El Paso Community College Rio Grande Campus	100 West Rio Grande Avenue	El Paso	Texas	79902
			Library	El Paso Community College Transmountain Campus	919 Hunter	El Paso	Texas	79902
Ms.	Mary Kaye	Donahue-Hooker	Director	El Paso Public Library	501 North Oregon	El Paso	Texas	79901
			Librarian	Holloman AFB Library	596 4th Street	Holloman AFB	New Mexico	88330
			Executive Director	Mescalero Community Library	148 Cottonwood Drive	Mescalero	New Mexico	88340

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
			Library	New Mexico State University Alamogordo	2400 Scenic Drive	Alamogordo	New Mexico	88310
			Executive Director	Ruidoso Public Library	107 Kansas City Road	Ruidoso	New Mexico	88345

Table A.4–11. Luke Federal, State, and Local Agencies Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Bob	Abbey	Director	Bureau of Land Management	1849 C Street Northwest, Room 5665	Washington	D.C	20240
Mr.	Jim	Kenna	State Director	Bureau of Land Management, Arizona State Office	One North Central Avenue, Suite 800	Phoenix	Arizona	85004-4427
Ms.	Becky	Heick	District Manager	Bureau of Land Management, Colorado River District Office	2610 Sweetwater Avenue	Lake Havasu City	Arizona	86406
Mr.	Tom	Dabbs	District Manager	Bureau of Land Management, Gila District Office	1763 Paseo San Luis	Sierra Vista	Arizona	85635
Mr.	Steve	Cohn	Field Manager	Bureau of Land Management, Hassayampa Field Office	21605 North 7th Avenue	Phoenix	Arizona	85027
Mr.	Ruben	Sanchez	Field Manager	Bureau of Land Management, Kingman Field Office	2755 Mission Boulevard	Kingman	Arizona	86401-5308
Mr.	Ramone	McCoy	Field Manager	Bureau of Land Management, Lake Havasu Field Office	2610 Sweetwater Avenue	Lake Havasu City	Arizona	86406
Ms.	Emily	Garber	Field Manager	Bureau of Land Management, Lower Sonoran Field Office	21605 North 7th Avenue	Phoenix	Arizona	85027
Ms.	Linda	Anania	District Manager	Bureau of Land Management, Phoenix District Office	21605 North 7th Avenue	Phoenix	Arizona	85027
Mr.	Scott	Cooke	Field Manager	Bureau of Land Management, Safford Field Office	711 14th Avenue	Safford	Arizona	85546
Ms.	Danita	Burns	Field Manager	Bureau of Land Management, Socorro Field Office	901 South Highway 85	Socorro	New Mexico	87801
Mr.	Brian	Bellow	Field Manager	Bureau of Land Management, Tucson Field Office	12661 East Broadway	Tucson	Arizona	85748
Mr.	Todd	Shoaff	Field Manager	Bureau of Land Management, Yuma Field Office	2555 East Gila Ridge Road	Yuma	Arizona	85365
Mr.	Michael	Connor	Commissioner	Bureau of Reclamation	1849 C Street Northwest	Washington	D.C.	20240
Ms.	Lori	Gray-Lee	Regional Director	Bureau of Reclamation, Lower Colorado Regional Office	PO Box 61470	Boulder City	New Mexico	89006
Ms.	Carol	Erwin	Area Manager	Bureau of Reclamation, Phoenix Area Office	6150 West Thunderbird Road	Glendale	Arizona	85306
Mr.	Bobby	Clark	Manager	Bureau of Reclamation, Socorro Field Division	2401 State Road 1, PO Box VV	Socorro	New Mexico	87801

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Larry	Walkoviak	Regional Director	Bureau of Reclamation, Upper Colorado Regional Office	125 South State Street, Room 6107	Salt Lake City	Utah	84138
Ms.	Jennifer	McCloskey	Area Manager	Bureau of Reclamation, Yuma Area Office	7301 Calle Agua Salada	Yuma	Arizona	85364
Mr.	J. Randolph	Babbitt	Administrator	Federal Aviation Administration	800 Independence Avenue, Southwest	Washington	D.C	20591
Ms.	Teresa	Bruner	Regional Administrator	Federal Aviation Administration, Southwest Region	2601 Meacham Boulevard	Fort Worth	Texas	76137
Mr.	William	Withycombe	Western-Pacific Regional Administrator	Federal Aviation Administration, Western-Pacific Region	PO Box 92007	Los Angeles	California	90009-2007
Mr.	Dan	Wenk	Director	National Park Service	1849 C Street Northwest	Washington	D.C.	20240
Mr.	Michael	Snyder	Regional Director	National Park Service, Intermountain Region	12795 Alameda Parkway	Denver	Colorado	80225
Mr.	Ken	Salazar	Secretary	United States Department of the Interior	1849 C Street, Northwest	Washington	D.C	20240
			Director	United States Environmental Protection Agency	1200 Pennsylvania Avenue Northwest	Washington	D.C.	20460
Dr.	Alfredo	Armendariz	Regional Administrator	United States Environmental Protection Agency, Region 6 Office of Planning and Coordination (6EN-XP)	1445 Ross Avenue, Suite 1200	Dallas	Texas	75202-2733
Ms.	Joyce	Stubblefield		United States Environmental Protection Agency, Region 6 Office of Planning and Coordination (6EN-XP)	1445 Ross Avenue, Suite 1200	Dallas	Texas	75202-2733
Ms.	Nova	Blazej	Regional NEPA Coordinator	United States Environmental Protection Agency, Region 9 Office	75 Hawthorne Street, CED-1	San Francisco	California	94105
Mr.	Jared	Blumenfeld	Regional Administrator	United States Environmental Protection Agency, Region 9 Office	75 Hawthorne Street	San Francisco	California	94105
Mr.	Benjamin	Grumbles	Director	Arizona Department of Environmental Quality	1110 West Washington Street	Phoenix	Arizona	85007
Ms.	Sybil	Smith	Northern Regional Director	Arizona Department of Environmental Quality - Northern Regional Office	1801 West Route 66, Suite 117	Flagstaff	Arizona	86001
Mr.	Martin	McCarthy	Southern Regional Director	Arizona Department of Environmental Quality - Southern Regional Office	400 West Congress, Suite 433	Tucson	Arizona	85701

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	John	Halikowski	Director	Arizona Department of Transportation	PO Box 2100	Phoenix	Arizona	85007-2100
Mr.	Michael	Klein	Airport Development Program Administrator	Arizona Department of Transportation - Aeronautics Division	206 South 17th Avenue	Phoenix	Arizona	85007
Mr.	Larry	Voyles	Director	Arizona Game and Fish Department	5000 West Carefree Highway	Phoenix	Arizona	85086-5000
			Director	Arizona Game and Fish Department, Region I	2878 East White Mountain Boulevard	Pinetop	Arizona	85935
			Director	Arizona Game and Fish Department, Region II	3500 South Lake Mary Road	Flagstaff	Arizona	86001
			Director	Arizona Game and Fish Department, Region III	5325 North Stockton Hill Road	Kingman	Arizona	86409
			Director	Arizona Game and Fish Department, Region IV	9140 East 28th Street	Yuma	Arizona	85365
			Director	Arizona Game and Fish Department, Region V	555 North Greasewood Road	Tucson	Arizona	85745
			Director	Arizona Game and Fish Department, Region VI	7200 East University	Mesa	Arizona	85207
Ms.	Maria	Baier	Land Commissioner	Arizona State Land Department	1616 West Adams Street	Phoenix	Arizona	85007
Mr.	Stephen	Williams	Director	Arizona State Land Department, Natural Resources Division	1616 West Adams	Phoenix	Arizona	85007
Mr.	Curtis	McCasland	Manager	Cabeza Prieta National Wildlife Refuge	1611 North Second Avenue	Ajo	Arizona	85321
Mr.	Lee	Baiza	Superintendent	Organ Pipe Cactus National Monument	10 Organ Pipe Drive	Ajo	Arizona	85321-9626
Mr.	Rich	Hanson	Manager	Sonoran Desert National Monument	21605 North 7th Avenue	Phoenix	Arizona	85027
Ms.	Sherri	Lee	Regional Manager	Program Manager, Military Installation Fund	1700 West Washington, Suite 420	Phoenix	Arizona	85007

Table A.4–12. Luke Bureau of Indian Affairs Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Larry	Echo Hawk	Assistant Secretary-Indian Affairs	Bureau of Indian Affairs	MS-4606, 1849 C Street, Northwest	Washington	D.C.	20240
Mr.	Allen	Anspach	Regional Director	Bureau of Indian Affairs, Western Regional Office	2600 North Central Avenue, 4th Floor Mailroom	Phoenix	Arizona	85004

Table A.4–13. Luke Federal, State, and Local Elected Officials Mailing List

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
Mr.	Dan	Hay	District Chief of Staff	Office of Congressman Trent Frank		7121 West Bell Road, Suite 200	Glendale	Arizona	85308
The Honorable	Jeff	Flake	Representative	U.S. House of Representatives	Arizona 6th Congressional District	1640 South Stapley, Suite 215	Mesa	Arizona	85204
The Honorable	Trent	Franks	Representative	U.S. House of Representatives	Arizona 2nd Congressional District	7121 West Bell Road, Suite 200	Glendale	Arizona	85308
The Honorable	Gabrielle	Giffords	Representative	U.S. House of Representatives	Arizona 8th Congressional District	77 Calle Portal, Suite B-160	Sierra Vista	Arizona	85635
The Honorable	Raul	Grijalva	Representative	U.S. House of Representatives	Arizona 7th Congressional District	1455 South 4th Avenue, Suite 4	Yuma	Arizona	85364
The Honorable	Ann	Kirkpatrick	Representative	U.S. House of Representatives	Arizona 1st Congressional District	1515 East Cedar Avenue, A6	Flagstaff	Arizona	86004
The Honorable	Harry	Mitchell	Representative	U.S. House of Representatives	Arizona 5th Congressional District	7201 East Camelback Road, Suite 335	Scottsdale	Arizona	85251
The Honorable	Ed	Pastor	Representative	U.S. House of Representatives	Arizona 4th Congressional District	411 North Central Avenue, Suite 150	Phoenix	Arizona	85004
The Honorable	John	Shadegg	Representative	U.S. House of Representatives	Arizona 3rd Congressional District	2400 East Arizona Biltmore Circle, Suite 1290	Phoenix	Arizona	85016
Ms.	Sandra	Ledy	Military Affairs Specialist	Senator Kyl's Office		2200 East Camelback, Suite 120	Phoenix	Arizona	85016
Mr.	Tom	McCanna	Staff Assistant	Senator McCain's Office		4703 South Lakeshore Drive, Suite 1	Tempe	Arizona	85282
The Honorable	Jon	Kyl	Senator	United States Senator		2200 East Camelback, Suite 120	Phoenix	Arizona	85016
The Honorable	John	McCain	Senator	United States Senator		5353 North 16th Street, Suite 105	Phoenix	Arizona	85016
The Honorable	Edward	Ableser	Representative	Arizona House of Representatives	District 17	1700 West Washington, Room 331	Phoenix	Arizona	85007
The Honorable	Kirk	Adams	Representative	Arizona House of Representatives	District 19	1700 West Washington, Room 221	Phoenix	Arizona	85007
The Honorable	Frank	Antenori	Representative	Arizona House of Representatives	District 30	1700 West Washington, Room 307	Phoenix	Arizona	85007
The Honorable	Cecil	Ash	Representative	Arizona House of Representatives	District 18	1700 West Washington, Room 127	Phoenix	Arizona	85007
The Honorable	Ray	Barnes	Representative	Arizona House of Representatives	District 7	1700 West Washington, Room 110	Phoenix	Arizona	85007
The Honorable	Nancy	Barto	Representative	Arizona House of Representatives	District 7	1700 West Washington, Room 112	Phoenix	Arizona	85007

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Andy	Biggs	Representative	Arizona House of Representatives	District 22	1700 West Washington, Room 312	Phoenix	Arizona	85007
The Honorable	Tom	Boone	Representative	Arizona House of Representatives	District 4	1700 West Washington, Room 313	Phoenix	Arizona	85007
The Honorable	Jack A.	Brown	Representative	Arizona House of Representatives	District 5	1700 West Washington, Room 316	Phoenix	Arizona	85007
The Honorable	Judy	Burges	Representative	Arizona House of Representatives	District 4	1700 West Washington, Room 342	Phoenix	Arizona	85007
The Honorable	Chad	Campbell	Representative	Arizona House of Representatives	District 14	1700 West Washington, Room 333	Phoenix	Arizona	85007
The Honorable	Cloves	Campbell, Jr.	Representative	Arizona House of Representatives	District 16	1700 West Washington, Room 124	Phoenix	Arizona	85007
The Honorable	Tom	Chabin	Representative	Arizona House of Representatives	District 2	1700 West Washington, Room 318	Phoenix	Arizona	85007
The Honorable	Steve	Court	Representative	Arizona House of Representatives	District 18	1700 West Washington, Room 118	Phoenix	Arizona	85007
The Honorable	Rich	Crandall	Representative	Arizona House of Representatives	District 19	1700 West Washington, Room 113	Phoenix	Arizona	85007
The Honorable	Sam	Crump	Representative	Arizona House of Representatives	District 6	1700 West Washington, Room 302	Phoenix	Arizona	85007
The Honorable	Christopher	Deschene	Representative	Arizona House of Representatives	District 2	1700 West Washington, Room 325	Phoenix	Arizona	85007
The Honorable	Adam	Driggs	Representative	Arizona House of Representatives	District 11	1700 West Washington, Room 222	Phoenix	Arizona	85007
The Honorable	Patricia	Fleming	Representative	Arizona House of Representatives	District 25	1700 West Washington, Room 125	Phoenix	Arizona	85007
The Honorable	Martha	Garcia	Representative	Arizona House of Representatives	District 13	1700 West Washington, Room 335	Phoenix	Arizona	85007
The Honorable	Doris	Goodale	Representative	Arizona House of Representatives	District 3	1700 West Washington, Room 310	Phoenix	Arizona	85007
The Honorable	David	Gowan	Representative	Arizona House of Representatives	District 30	1700 West Washington, Room 117	Phoenix	Arizona	85007
The Honorable	Laurin	Hendrix	Representative	Arizona House of Representatives	District 22	1700 West Washington, Room 344	Phoenix	Arizona	85007
The Honorable	Russell	Jones	Representative	Arizona House of Representatives	District 24	1700 West Washington, Room 345	Phoenix	Arizona	85007
The Honorable	John	Kavanagh	Representative	Arizona House of Representatives	District 8	1700 West Washington, Room 114	Phoenix	Arizona	85007
The Honorable	Bill	Konopnicki	Representative	Arizona House of Representatives	District 5	1700 West Washington, Room 219	Phoenix	Arizona	85007

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Debbie	Lesko	Representative	Arizona House of Representatives	District 9	1700 West Washington, Room 129	Phoenix	Arizona	85007
The Honorable	David	Lujan	Representative	Arizona House of Representatives	District 15	1700 West Washington, Room 320	Phoenix	Arizona	85007
The Honorable	Lucy	Mason	Representative	Arizona House of Representatives	District 1	1700 West Washington, Room 304	Phoenix	Arizona	85007
The Honorable	John	McComish	Representative	Arizona House of Representatives	District 20	1700 West Washington, Room 206	Phoenix	Arizona	85007
The Honorable	Barbara	McGuire	Representative	Arizona House of Representatives	District 23	1700 West Washington, Room 322	Phoenix	Arizona	85007
The Honorable	Nancy	McLain	Representative	Arizona House of Representatives	District 3	1700 West Washington, Room 303	Phoenix	Arizona	85007
The Honorable	Eric	Meyer	Representative	Arizona House of Representatives	District 11	1700 West Washington, Room 121	Phoenix	Arizona	85007
The Honorable	Robert	Meza	Representative	Arizona House of Representatives	District 14	1700 West Washington, Room 339	Phoenix	Arizona	85007
The Honorable	Ben	Miranda	Representative	Arizona House of Representatives	District 16	1700 West Washington, Room 323	Phoenix	Arizona	85007
The Honorable	Steve	Montenegro	Representative	Arizona House of Representatives	District 12	1700 West Washington, Room 309	Phoenix	Arizona	85007
The Honorable	Rick	Murphy	Representative	Arizona House of Representatives	District 9	1700 West Washington, Room 111	Phoenix	Arizona	85007
The Honorable	Warde	Nichols	Representative	Arizona House of Representatives	District 21	1700 West Washington, Room 306	Phoenix	Arizona	85007
The Honorable	Lynne	Pancrazi	Representative	Arizona House of Representatives	District 24	1700 West Washington, Room 324	Phoenix	Arizona	85007
The Honorable	Frank	Pratt	Representative	Arizona House of Representatives	District 23	1700 West Washington, Room 115	Phoenix	Arizona	85007
The Honorable	Doug	Quelland	Representative	Arizona House of Representatives	District 10	1700 West Washington, Room 128	Phoenix	Arizona	85007
The Honorable	Michele	Reagan	Representative	Arizona House of Representatives	District 8	1700 West Washington, Room 220	Phoenix	Arizona	85007
The Honorable	David	Schapira	Representative	Arizona House of Representatives	District 17	1700 West Washington, Room 332	Phoenix	Arizona	85007
The Honorable	Carl	Seel	Representative	Arizona House of Representatives	District 6	1700 West Washington, Room 341	Phoenix	Arizona	85007
The Honorable	Kyrsten	Sinema	Representative	Arizona House of Representatives	District 15	1700 West Washington, Room 321	Phoenix	Arizona	85007
The Honorable	David	Stevens	Representative	Arizona House of Representatives	District 25	1700 West Washington, Room 116	Phoenix	Arizona	85007

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Andrew	Tobin	Representative	Arizona House of Representatives	District 1	1700 West Washington, Room 217	Phoenix	Arizona	85007
The Honorable	Anna	Tovar	Representative	Arizona House of Representatives	District 13	1700 West Washington, Room 325	Phoenix	Arizona	85007
The Honorable	Rae	Waters	Representative	Arizona House of Representatives	District 20	1700 West Washington, Room 122	Phoenix	Arizona	85007
The Honorable	Jim	Weiers	Representative	Arizona House of Representatives	District 10	1700 West Washington, Room 223	Phoenix	Arizona	85007
The Honorable	Jerry	Weiers	Representative	Arizona House of Representatives	District 12	1700 West Washington, Room 131	Phoenix	Arizona	85007
The Honorable	Steven	Yarbrough	Representative	Arizona House of Representatives	District 21	1700 West Washington, Room 218	Phoenix	Arizona	85007
The Honorable	Amanda	Aguirre	Senator	Arizona Senate	District 24	1700 West Washington, Room 314	Phoenix	Arizona	85007
The Honorable	Sylvia	Allen	Senator	Arizona Senate	District 5	1700 West Washington, Room 307	Phoenix	Arizona	85007
The Honorable	Carolyn	Allen	Senator	Arizona Senate	District 8	1700 West Washington, Room 303	Phoenix	Arizona	85007
The Honorable	Manuel	Alvarez	Senator	Arizona Senate	District 25	1700 West Washington, Room 311	Phoenix	Arizona	85007
The Honorable	Robert	Burns	Senator	Arizona Senate	District 9	1700 West Washington, Room 204	Phoenix	Arizona	85007
The Honorable	Meg	Burton Cahill	Senator	Arizona Senate	District 17	1700 West Washington, Room 313	Phoenix	Arizona	85007
The Honorable	Ken	Cheuvront	Senator	Arizona Senate	District 15	1700 West Washington, Room 315	Phoenix	Arizona	85007
The Honorable	Pamela	Gorman	Senator	Arizona Senate	District 6	1700 West Washington, Room 304	Phoenix	Arizona	85007
The Honorable	Ron	Gould	Senator	Arizona Senate	District 3	1700 West Washington, Room 303	Phoenix	Arizona	85007
The Honorable	Linda	Gray	Senator	Arizona Senate	District 10	1700 West Washington, Room 309	Phoenix	Arizona	85007
The Honorable	Chuck	Gray	Senator	Arizona Senate	District 19	1700 West Washington, Room 212	Phoenix	Arizona	85007
The Honorable	Albert	Hale	Senator	Arizona Senate	District 2	1700 West Washington, Room 313	Phoenix	Arizona	85007
The Honorable	Jack	Harper	Senator	Arizona Senate	District 4	1700 West Washington, Room 301	Phoenix	Arizona	85007
The Honorable	John	Huppenthal	Senator	Arizona Senate	District 20	1700 West Washington, Room 300	Phoenix	Arizona	85007

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Leah	Landrum Taylor	Senator	Arizona Senate	District 16	1700 West Washington, Room 312	Phoenix	Arizona	85007
The Honorable	Barbara	Leff	Senator	Arizona Senate	District 11	1700 West Washington, Room 302	Phoenix	Arizona	85007
The Honorable	Debbie	McCune Davis	Senator	Arizona Senate	District 14	1700 West Washington, Room 311	Phoenix	Arizona	85007
The Honorable	Richard	Miranda	Senator	Arizona Senate	District 13	1700 West Washington, Room 308	Phoenix	Arizona	85007
The Honorable	John	Nelson	Senator	Arizona Senate	District 12	1700 West Washington, Room 305	Phoenix	Arizona	85007
The Honorable	Jonathan	Paton	Senator	Arizona Senate	District 30	1700 West Washington, Room 304	Phoenix	Arizona	85007
The Honorable	Russell	Pearce	Senator	Arizona Senate	District 18	1700 West Washington, Room 110	Phoenix	Arizona	85007
The Honorable	Steve	Pierce	Senator	Arizona Senate	District 1	1700 West Washington, Room 212	Phoenix	Arizona	85007
The Honorable	Rebecca	Rios	Senator	Arizona Senate	District 23	1700 West Washington, Room 213	Phoenix	Arizona	85007
The Honorable	Jay	Tibshraeny	Senator	Arizona Senate	District 21	1700 West Washington, Room 306	Phoenix	Arizona	85007
The Honorable	Thayer	Verschoor	Senator	Arizona Senate	District 22	1700 West Washington, Room 310	Phoenix	Arizona	85007
The Honorable	Jim	Waring	Senator	Arizona Senate	District 7	1700 West Washington, Room 302	Phoenix	Arizona	85007
The Honorable	Jan	Brewer		Governor of Arizona		1700 West Washington	Phoenix	Arizona	85007
Mr.	Victor	Daniels	Policy Advisor, Urban Outreach and Military Affairs	Governor's Office		1700 West Washington	Phoenix	Arizona	85007
The Honorable	Michele	Kern	Acting Mayor of El Mirage	Acting Mayor of El Mirage		12145 Northwest Grand Avenue	El Mirage	Arizona	85336
The Honorable	R. John	Lee	Supervisor	Apache County	District 3	PO Box 428	Saint Johns	Arizona	85936
The Honorable	Loyd Allen	Lambert	Commissioner, Chair	Board of Commissioners Catron County		PO Box 507	Reserve	New Mexico	87830
The Honorable	Hugh B.	McKeen	Commissioner	Board of Commissioners Catron County		PO Box 507	Reserve	New Mexico	87830
The Honorable	Francis Edward	Wehrheim	Commissioner	Board of Commissioners Catron County		PO Box 507	Reserve	New Mexico	87830
The Honorable	Elizabeth	Archuleta	Supervisor	Board of Supervisors of Coconino County	District 2	219 East Cherry Avenue	Flagstaff	Arizona	86001

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Lena	Fowler	Supervisor	Board of Supervisors of Coconino County	District 5	219 East Cherry Avenue	Flagstaff	Arizona	86001
The Honorable	Mandy	Metzger	Supervisor	Board of Supervisors of Coconino County	District 4	219 East Cherry Avenue	Flagstaff	Arizona	86001
The Honorable	Matt	Ryan	Chair, Board of Supervisors	Board of Supervisors of Coconino County	District 3	219 East Cherry Avenue	Flagstaff	Arizona	86001
The Honorable	Carl	Taylor	Supervisor	Board of Supervisors of Coconino County	District 1	219 East Cherry Avenue	Flagstaff	Arizona	86001
The Honorable	Shirley	Dawson	Chair, Board of Supervisors	Board of Supervisors of Gila County	District 3	1400 East Ash Street	Globe	Arizona	85501
The Honorable	Tommie	Martin	Supervisor	Board of Supervisors of Gila County	District 1	1400 East Ash Street	Globe	Arizona	85501
The Honorable	Michael	Pastor	Supervisor	Board of Supervisors of Gila County	District 2	1400 East Ash Street	Globe	Arizona	85501
The Honorable	Mark	Herrington	Chair, Board of Supervisors	Board of Supervisors of Graham County	District 3	921 West Thatcher Boulevard	Safford	Arizona	85546
The Honorable	Drew	John	Supervisor	Board of Supervisors of Graham County	District 1	921 West Thatcher Boulevard	Safford	Arizona	85546
The Honorable	Jim	Palmer	Supervisor	Board of Supervisors of Graham County	District 2	921 West Thatcher Boulevard	Safford	Arizona	85546
The Honorable	David	Gomez	Supervisor	Board of Supervisors of Greenlee County	District 1	PO Box 908	Clifton	Arizona	85533
The Honorable	Richard	Lunt	Supervisor	Board of Supervisors of Greenlee County	District 3	PO Box 908	Clifton	Arizona	85533
The Honorable	Hector	Ruedas	Chair, Board of Supervisors	Board of Supervisors of Greenlee County	District 2	PO Box 908	Clifton	Arizona	85533
The Honorable	John	Drum	Supervisor	Board of Supervisors of La Paz County	District 2	1108 Joshua Avenue	Parker	Arizona	85344
The Honorable	Holly	Irwin	Supervisor	Board of Supervisors of La Paz County	District 3	1108 Joshua Avenue	Parker	Arizona	85344
The Honorable	Sandy	Pierce	Chair, Board of Supervisors	Board of Supervisors of La Paz County	District 1	1108 Joshua Avenue	Parker	Arizona	85344
The Honorable	Fulton	Brock	Supervisor	Board of Supervisors of Maricopa County	District 1	301 West Jefferson Street, 10th Floor	Phoenix	Arizona	85003
The Honorable	Andrew	Kunasek	Supervisor	Board of Supervisors of Maricopa County	District 3	301 West Jefferson Street, 10th Floor	Phoenix	Arizona	85003
The Honorable	Don	Stapley	Supervisor	Board of Supervisors of Maricopa County	District 2	301 West Jefferson Street, 10th Floor	Phoenix	Arizona	85003
The Honorable	Mary Rose	Wilcox	Supervisor	Board of Supervisors of Maricopa County	District 5	301 West Jefferson Street, 10th Floor	Phoenix	Arizona	85003

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Max	Wilson	Chair, Board of Supervisors	Board of Supervisors of Maricopa County	District 4	301 West Jefferson Street, 10th Floor	Phoenix	Arizona	85003
The Honorable	Buster	Johnson	Supervisor	Board of Supervisors of Mohave County	District 3	PO Box 7000	Kingman	Arizona	86402
The Honorable	Tom	Sockwell	Supervisor	Board of Supervisors of Mohave County	District 2	PO Box 7000	Kingman	Arizona	86402
The Honorable	Gary	Watson	Supervisor	Board of Supervisors of Mohave County	District 1	PO Box 7000	Kingman	Arizona	86402
The Honorable	Jerry	Brownlow	Supervisor	Board of Supervisors of Navajo County	District 5	PO Box 668	Holbrook	Arizona	86025
The Honorable	J.R.	DeSpain	Supervisor	Board of Supervisors of Navajo County	District 3	PO Box 668	Holbrook	Arizona	86025
The Honorable	Jonathan	Nez	Supervisor	Board of Supervisors of Navajo County	District 1	PO Box 668	Holbrook	Arizona	86025
The Honorable	David	Tenney	Supervisor	Board of Supervisors of Navajo County	District 4	PO Box 668	Holbrook	Arizona	86025
The Honorable	Jesse	Thompson	Supervisor	Board of Supervisors of Navajo County	District 2	PO Box 668	Holbrook	Arizona	86025
The Honorable	Sharon	Bronson	Supervisor	Board of Supervisors of Pima County	District 3	130 West Congress Street, 11th Floor	Tucson	Arizona	85701
The Honorable	Raymond	Carroll	Supervisor	Board of Supervisors of Pima County	District 4	130 West Congress Street, 11th Floor	Tucson	Arizona	85701
The Honorable	Ann	Day	Supervisor	Board of Supervisors of Pima County	District 1	130 West Congress Street, 11th Floor	Tucson	Arizona	85701
The Honorable	Richard	Elías	Chair, Board of Supervisors	Board of Supervisors of Pima County	District 5	130 West Congress Street, 11th Floor	Tucson	Arizona	85701
The Honorable	Ramón	Valadez	Supervisor	Board of Supervisors of Pima County	District 2	130 West Congress Street, 11th Floor	Tucson	Arizona	85701
The Honorable	Bryan	Martyn	Supervisor	Board of Supervisors of Pinal County	District 2	PO Box 827	Florence	Arizona	85132
The Honorable	Pete	Rios	Supervisor	Board of Supervisors of Pinal County	District 1	PO Box 827	Florence	Arizona	85132
The Honorable	David	Snider	Chair, Board of Supervisors	Board of Supervisors of Pinal County	District 3	PO Box 827	Florence	Arizona	85132
The Honorable	Roy	Wilson	Supervisor	Board of Supervisors of Riverside County		4080 Lemon Street, 5th Floor	Riverside	California	92501
The Honorable	John	Maynard	Chair, Board of Supervisors	Board of Supervisors of Santa Cruz County	District 3	2150 North Congress Drive	Nogales	Arizona	85621
The Honorable	Rudy	Molera	Supervisor	Board of Supervisors of Santa Cruz County	District 2	2150 North Congress Drive	Nogales	Arizona	85621

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Manuel	Ruiz	Supervisor	Board of Supervisors of Santa Cruz County	District 1	2150 North Congress Drive	Nogales	Arizona	85621
The Honorable	Phillip	Anaya	Commissioner	Board of Supervisors of Socorro County		PO Box I	Socorro	New Mexico	87801
The Honorable	Rumaldo	Griego	Commissioner	Board of Supervisors of Socorro County		PO Box I	Socorro	New Mexico	87801
The Honorable	Juan	Gutierrez	Commissioner	Board of Supervisors of Socorro County		PO Box I	Socorro	New Mexico	87801
The Honorable	Daniel	Monette	Commissioner	Board of Supervisors of Socorro County		PO Box I	Socorro	New Mexico	87801
The Honorable	Rosalind	Tripp	Commissioner	Board of Supervisors of Socorro County		PO Box I	Socorro	New Mexico	87801
The Honorable	Chip	Davis	Chair, Board of Supervisors	Board of Supervisors of Yavapai County	District 3	1015 Fair Street	Prescott	Arizona	86305
The Honorable	Carol	Springer	Supervisor	Board of Supervisors of Yavapai County	District 1	1015 Fair Street	Prescott	Arizona	86305
The Honorable	Thomas	Thurman	Supervisor	Board of Supervisors of Yavapai County	District 2	1015 Fair Street	Prescott	Arizona	86305
The Honorable	Greg	Ferguson	Supervisor	Board of Supervisors of Yuma County	District 5	198 South Main Street	Yuma	Arizona	85364
The Honorable	Lenore	Loroña Stuart	Supervisor	Board of Supervisors of Yuma County	District 1	198 South Main Street	Yuma	Arizona	85364
The Honorable	Russell	McCloud	Supervisor	Board of Supervisors of Yuma County	District 2	198 South Main Street	Yuma	Arizona	85364
The Honorable	Kathryn	Prochaska	Supervisor	Board of Supervisors of Yuma County	District 3	198 South Main Street	Yuma	Arizona	85364
The Honorable	Marco	Reyes	Supervisor	Board of Supervisors of Yuma County	District 4	198 South Main Street	Yuma	Arizona	85364
Ms.	Sammi	Curless	Assistant to Mayor's Council	City of Avondale		11465 West Civic Center Drive	Avondale	Arizona	85323
Ms.	Shirley	Gunther	Intergovernmental Affairs Manager	City of Avondale		11465 West Civic Center Drive	Avondale	Arizona	85323
Mr.	B.J.	Cornwall	City Manager	City of El Mirage		12145 Northwest Grand Avenue	El Mirage	Arizona	85336
Mr.	Steven	Methvin		City of Glendale, Office of the Mayor		5850 West Glendale Avenue	Glendale	Arizona	85301
Mr.	John	Fischbach	City Manager	City of Goodyear		190 North Litchfield Road	Goodyear	Arizona	85338
Ms.	Romina	Korkes	Intergovernmental Programs Manager	City of Goodyear		190 North Litchfield Road	Goodyear	Arizona	85338

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
Ms.	Betsy	Rice	Assistant to the Mayor	City of Goodyear		190 North Litchfield Road	Goodyear	Arizona	85338
Mr.	Darryl	Crossman	City Manager	City of Litchfield Park		214 West Wigwam Boulevard	Litchfield Park	Arizona	85340
Mr.	Sonny	Culbreth	Assistant City Manager	City of Litchfield Park		214 West Wigwam Boulevard	Litchfield Park	Arizona	85340
Ms.	Lisa	Estrada	Intergovernmental Affairs Coordinator	City of Peoria		8401 West Monroe Street	Peoria	Arizona	85345
Mr.	John	Schell	Director, Intergovernmental Affairs	City of Peoria		8401 West Monroe Street	Peoria	Arizona	85345
Ms.	Karen	Peters	Intergovernmental Affairs Director	City of Phoenix		200 West Washington Street, 12th Floor	Phoenix	Arizona	85003
The Honorable	Thelda	Williams	Councilwoman	City of Phoenix	District 1	200 West Washington Street, 11th Floor	Phoenix	Arizona	85003
Mr.	Michael	Celaya	Intergovernmental Programs Manager	City of Surprise		12425 West Bell Road, Suite D-100	Surprise	Arizona	85374
Mr.	Randy	Oliver	City Manager	City of Surprise		12425 West Bell Road, Suite D-100	Surprise	Arizona	85374
Mr.	Scott	Isham	Chief of Staff, Supervisor Wilson	Maricopa County		301 West Jefferson Street, 10th Floor	Phoenix	Arizona	85003
The Honorable	Marie	Lopez Rogers		Mayor of Avondale		11465 West Civic Center Drive	Avondale	Arizona	85323
The Honorable	Jackie	Meck		Mayor of Buckeye		1101 East Ash Avenue East	Buckeye	Arizona	85326
The Honorable	Ron	Henry		Mayor of Gila Bend		PO Box A	Gila Bend	Arizona	85337
The Honorable	Elaine	Scruggs		Mayor of Glendale		5850 West Glendale Avenue	Glendale	Arizona	85301
The Honorable	James	Cavanaugh		Mayor of Goodyear		190 North Litchfield Road	Goodyear	Arizona	85338
The Honorable	Thomas	Schoaf		Mayor of Litchfield Park		214 West Wigwam Boulevard	Litchfield Park	Arizona	85340
The Honorable	Bob	Barrett		Mayor of Peoria		8401 West Monroe Street	Peoria	Arizona	85345
The Honorable	Lyn	Truitt		Mayor of Surprise		12425 West Bell Road, Suite D-100	Surprise	Arizona	85374
The Honorable	Adolfo	Gamez		Mayor of Tolleson		9555 West Van Buren	Tolleson	Arizona	85353

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Kelly	Blunt		Mayor of Wickenburg		155 North Tegner Street, Suite A	Wickenburg	Arizona	85358
The Honorable	Michael	Levault		Mayor of Youngtown		PO Box 242	Youngtown	Arizona	85363
Mr.	Bob	Bushner	Public Information Officer	Town of Buckeye		1101 East Ash Avenue East	Buckeye	Arizona	85326
Ms.	Jeanine	Guy	Town Manager	Town of Buckeye		1101 East Ash Avenue East	Buckeye	Arizona	85326
Mr.	Fredrick	Buss	Town Manager	Town of Gila Bend		PO Box A	Gila Bend	Arizona	85337
Ms.	Lloyce	Robinson	Town Manager	Town of Youngtown		12030 Clubhouse Square	Youngtown	Arizona	85363

Table A.4–14. Luke U.S. Fish and Wildlife Service (Endangered Species Act) Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Jim	Rorabaugh	Ecological Services	United States Fish and Wildlife Services	201 North Bonita Avenue, Suite 141	Tucson	Arizona	85745

Table A.4–15. Luke General Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Ronald	Pearce	Director, MCAS Range Management Office	Marine Corps Air Station, Yuma	PO Box 99160	Yuma	Arizona	85369
Mr.	Louis J.	Manuel	Chairman	Ak-Chin Indian Community	42507 West Peters and Nall Road	Maricopa	Arizona	85239
Ms.	Sherry	Cordova	Chairman	Cocopah Tribe	County 15 & Avenue G	Somerton	Arizona	85350
Mr.	Eldred	Enas	Chairman	Colorado River Indian Tribes	Route 1, Box 23-B	Parker	Arizona	85344
Dr.	Clinton	Pattea, Ph.D.	President	Fort McDowell Yavapai Nation	PO Box 17779	Fountain Hills	Arizona	85269
Mr.	Timothy	Williams	Chairman	Fort Mojave Indian Tribe	500 Merriman Avenue	Needles	California	92363
Mr.	Mike	Jackson, Sr.	President	Fort Yuma-Quechan Tribe	PO Box 1899	Yuma	Arizona	85366
Mr.	William	Rhodes	Governor	Gila River Indian Community	PO Box 97	Sacaton	Arizona	85247
Mr.	Leroy	Shingoitewa	Chairman	Hopi Tribe	PO Box 123	Kykotsmovi	Arizona	86039
Mr.	Wilfred	Whatoname, Sr.	Chairman	Hualapai Tribe	PO Box 179	Peach Springs	Arizona	86434
Ms.	Ona	Segundo	Chairman	Kaibab Band of Paiute Indians	HC 65, Box 2	Fredonia	Arizona	86022
Mr.	Norman	Cooeyate	Governor	Pueblo of Zuni	PO Box 339	Zuni	New Mexico	87327

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Ms.	Diane	Enos	President	Salt River Pima-Maricopa Indian Community	10005 East Osborn Road	Scottsdale	Arizona	85256
Mr.	Wendsler	Nosie, Sr.	Chairman	San Carlos Apache Tribe	PO Box O	San Carlos	Arizona	85550
Mr.	Ned	Norris	Chairman	Tohono O'Odham Nation	PO Box 837	Sells	Arizona	85634
Mr.	Thomas	Beauty	Chairman	Yavapai-Apache Nation	2400 West Datsi	Camp Verde	Arizona	86322
Mr.	Ernest	Jones, Sr.	President	Yavapai-Prescott Indian Tribe	530 East Merritt	Prescott	Arizona	86301
Ms.	Stacy	Howard	Regional Representative	Aircraft Owners and Pilots Association	41695 North Coyote Road	Queen Creek	Arizona	85242
Ms.	Nancy	Benscoter	President	Arizona Pilots Association	PO Box 61242	Phoenix	Arizona	85082-1242
Mr.	Jim	Timm	Executive Director	Arizona Pilots Association	220 East Ellis Drive	Tempe	Arizona	85282
Mr.	Steve	Yamamori	Executive Director	Fighter Country Partnership	13708 West Glendale Avenue East	Glendale	Arizona	85307
Ms.	Lisa	Atkins	Co-Chair	Governor's Military Affairs Commission	516 North Old Litchfield Road	Litchfield Park	Arizona	85340
Mr.	Larry	Woods	President	Property Owners & Residents Association	15141 West Horseman North	Sun City West	Arizona	85375
Mr.	Matt	Szydlowski	Governing Board President	Recreation Centers of Sun City West	19803 R.H. Johnson Boulevard	Sun City West	Arizona	85375
Mr.	Ben	Roloff	President	Sun City Home Owners Association	10401 Coggins Drive West	Sun City	Arizona	85351
Mr.	Jack	Lunsford	President and CEO	WESTMARC	14100 North 83rd Avenue, Suite 150	Peoria	Arizona	85381

Table A.4–16. Tucson Federal, State, and Local Agencies Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Bob	Abbey	Director	Bureau of Land Management	1849 C Street Northwest, Room 5665	Washington	D.C.	20240
Mr.	Brian	Bellew	Field Manager	Bureau of Land Management - Tucson Field Office	12661 East Broadway	Tucson	Arizona	85748
Mr.	Jim	Kenna	State Director	Bureau of Land Management, Arizona State Office	One North Central Avenue, Suite 800	Phoenix	Arizona	85004
Mr.	Michael	Connor	Commissioner	Bureau of Reclamation	1849 C Street Northwest	Washington	D.C.	20240
Ms.	Lori	Gray-Lee	Regional Director	Bureau of Reclamation, Lower Colorado Regional Office	PO Box 61470	Boulder City	Nevada	89006
Mr.	J. Randolph	Babbitt	Administrator	Federal Aviation Administration	800 Independence Avenue, Southwest	Washington	D.C.	20591

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	William C.	Withycombe	Regional Administrator	Federal Aviation Administration - Western Pacific Region	PO Box 92007	Los Angeles	California	90007
Ms.	Teresa	Bruner	Regional Administrator	Federal Aviation Administration, Southwest Region	2601 Meacham Boulevard	Fort Worth	Texas	76137
Mr.	John	Jarvis	Director	National Park Service	1849 C Street, Northwest	Washington	D.C.	20240
Mr.	Michael	Snyder	Regional Director	National Park Service – Intermountain Region	12795 Alameda Parkway	Denver	Colorado	80225
Mr.	Thomas J.	Field	Chief Public Affairs Officer	United States Army Corps of Engineers - Los Angeles District	915 Wilshire Boulevard, Suite 1101	Los Angeles	California	90017
Mr.	Leon	Roberts	Public Affairs Specialists	United States Army Corps of Engineers - Phoenix Office	3636 North Central Avenue	Phoenix	Arizona	85012
Mr.	Robert	Gilbert	Chief Patrol Agent	United States Border Patrol	2430 South Swan Road	Tucson	Arizona	85711
The Honorable	Ken	Salazar	Secretary	United States Department of the Interior	1849 C Street, Northwest	Washington	D.C.	20240
Ms.	Nova	Blazej	Regional NEPA Coordinator	United States Environmental Protection Agency, Region 9 Office	75 Hawthorne Street, CED-1	San Francisco	California	94105
Mr.	Jared	Blumenfeld	Regional Administrator	United States Environmental Protection Agency, Region 9 Office	75 Hawthorne Street	San Francisco	California	94105
Mr.	Benjamin H.	Grumbles	Director	Arizona Department of Environmental Quality	1110 West Washington Street	Phoenix	Arizona	85007
Mr.	Martin	McCarthy	Acting Director, Southern Regional Office	Arizona Department of Environmental Quality - Southern Regional Office	400 West Congress, Suite 433	Tucson	Arizona	85701
Mr.	Barclay	Dick	Aeronautics Division Director	Arizona Department of Transportation - Aeronautics	206 South 17th Avenue	Phoenix	Arizona	85007
Mr.	Ira	Domsky	Acting Air Quality Division Director	Arizona Department of Transportation - Air Quality Division	206 South 17th Avenue	Phoenix	Arizona	85007
Mr.	Raul	Vega	Regional Supervisor	Arizona Game and Fish Department, Region V	555 North Greasewood Road	Tucson	Arizona	85745
Ms.	Bonnie	Allin		Tucson Airport Authority	7005 South Plumer Avenue	Tucson	Arizona	85706

Table A.4–17. Tucson Bureau of Indian Affairs Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Mr.	Larry	Echo Hawk	Assistant Secretary-Indian Affairs	Bureau of Indian Affairs	MS-4606, 1849 C Street, Northwest	Washington	D.C.	20240
Mr.	Allen	Anspach	Regional Director	Bureau of Indian Affairs, Western Regional Office	2600 North Central Avenue, 4th Floor	Phoenix	Arizona	85004

Table A.4–18. Tucson Federal, State, and Local Elected Officials Mailing List

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Gabrielle	Giffords	Representative	U.S. House of Representatives	District 8	1661 North Swan, Suite 112	Tucson	Arizona	85712
The Honorable	Raul	Grijalva	Representative	U.S. House of Representatives	District 7	810 East 22nd Street, Suite 102	Tucson	Arizona	85713
The Honorable	Ann	Kirkpatrick	Representative	U.S. House of Representatives	District 1	1515 East Cedar Avenue, A6	Flagstaff	Arizona	86004
The Honorable	Jon	Kyl	Senator	United States Senator		6840 North Oracle Road, Suite 150	Tucson	Arizona	85704
The Honorable	John	McCain	Senator	United States Senator		407 West Congress Street, Suite 103	Tucson	Arizona	85701
The Honorable	Sandra	Kennedy	Commissioner	Arizona Corporation Commission		1200 West Washington, 2nd floor	Phoenix	Arizona	85007
The Honorable	Kristin K.	Mayes	Commissioner	Arizona Corporation Commission		1200 West Washington, 2nd floor	Phoenix	Arizona	85007
The Honorable	Paul	Newman	Commissioner	Arizona Corporation Commission		1200 West Washington, 2nd floor	Phoenix	Arizona	85007
The Honorable	Gary	Pierce	Commissioner	Arizona Corporation Commission		1200 West Washington, 2nd floor	Phoenix	Arizona	85007
The Honorable	Bob	Stump	Commissioner	Arizona Corporation Commission		1200 West Washington, 2nd floor	Phoenix	Arizona	85007
The Honorable	Frank	Antenori	Representative	Arizona House of Representatives	District 30	1700 West Washington, Room 307	Phoenix	Arizona	85007
The Honorable	Olivia C.	Bedford	Representative	Arizona House of Representatives	District 27	1700 West Washington, Room 338	Phoenix	Arizona	85007
The Honorable	David	Bradley	Representative	Arizona House of Representatives	District 28	1700 West Washington, Room 337	Phoenix	Arizona	85007
The Honorable	Jack A.	Brown	Representative	Arizona House of Representatives	District 5	1700 West Washington, Room 316	Phoenix	Arizona	85007
The Honorable	Steve	Farley	Representative	Arizona House of Representatives	District 28	1700 West Washington, Room 119	Phoenix	Arizona	85007
The Honorable	Patricia V.	Fleming	Representative	Arizona House of Representatives	District 25	1700 West Washington, Room 125	Phoenix	Arizona	85007
The Honorable	David	Gowan	Representative	Arizona House of Representatives	District 30	1700 West Washington, Room 117	Phoenix	Arizona	85007

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Matt	Heinz	Representative	Arizona House of Representatives	District 29	1700 West Washington, Room 126	Phoenix	Arizona	85007
The Honorable	Bill	Konopnicki	Representative	Arizona House of Representatives	District 5	1700 West Washington, Room 219	Phoenix	Arizona	85007
The Honorable	Phil	Lopes	Representative	Arizona House of Representatives	District 27	1700 West Washington, Room 330	Phoenix	Arizona	85007
The Honorable	Lucy	Mason	Representative	Arizona House of Representatives	District 1	1700 West Washington, Room 304	Phoenix	Arizona	85007
The Honorable	Barbara	McGuire	Representative	Arizona House of Representatives	District 23	1700 West Washington, Room 322	Phoenix	Arizona	85007
The Honorable	Daniel	Patterson	Representative	Arizona House of Representatives	District 29	1700 West Washington, Room 123	Phoenix	Arizona	85007
The Honorable	Frank	Pratt	Representative	Arizona House of Representatives	District 23	1700 West Washington, Room 115	Phoenix	Arizona	85007
The Honorable	David W.	Stevens	Representative	Arizona House of Representatives	District 25	1700 West Washington, Room 116	Phoenix	Arizona	85007
The Honorable	Andrew M.	Tobin	Representative	Arizona House of Representatives	District 1	1700 West Washington, Room 217	Phoenix	Arizona	85007
The Honorable	Jerry	Weiers	Representative	Arizona House of Representatives	District 12	1700 West Washington, Room 131	Phoenix	Arizona	85007
The Honorable	Vic	Williams	Representative	Arizona House of Representatives	District 26	1700 West Washington, Room 308	Phoenix	Arizona	85007
The Honorable	Nancy Y.	Wright	Representative	Arizona House of Representatives	District 26	1700 West Washington, Room 329	Phoenix	Arizona	85007
The Honorable	Paula	Aboud	Senator	Arizona Senate	District 28	1700 West Washington, Room 314	Phoenix	Arizona	85007
The Honorable	Sylvia	Allen	Senator	Arizona Senate	District 5	1700 West Washington, Room 307	Phoenix	Arizona	85007
The Honorable	Manuel V.	Alvarez	Senator	Arizona Senate	District 25	1700 West Washington, Room 311	Phoenix	Arizona	85007
The Honorable	Jorge Luis	Garcia	Senator	Arizona Senate	District 27	1700 West Washington, Room 213	Phoenix	Arizona	85007
The Honorable	Linda	Lopez	Senator	Arizona Senate	District 29	1700 West Washington, Room 315	Phoenix	Arizona	85007
The Honorable	Al	Melvin	Senator	Arizona Senate	District 26	1700 West Washington, Room 303	Phoenix	Arizona	85007
The Honorable	Jonathan	Paton	Senator	Arizona Senate	District 30	1700 West Washington, Room 304	Phoenix	Arizona	85007
The Honorable	Steve	Pierce	Senator	Arizona Senate	District 1	1700 West Washington, Room 212	Phoenix	Arizona	85007

Salutation	First Name	Last Name	Title	Organization	District	Street	City	State	Zip
The Honorable	Rebecca	Rios	Senator	Arizona Senate	District 23	1700 West Washington, Room 213	Phoenix	Arizona	85007
The Honorable	Jan	Brewer		Governor of Arizona		1700 West Washington	Phoenix	Arizona	85007
Ms.	Britann	O'Brien	Director	Southern Arizona Office of the Governor		400 West Congress, Suite 504	Tucson	Arizona	85701
The Honorable	Ken	Bennett	Secretary of State of Arizona	State of Arizona		1700 West Washington Street, 7th Floor	Phoenix	Arizona	85007
The Honorable	Terry	Goddard	Attorney General	State of Arizona		1275 West Washington Street	Phoenix	Arizona	85007
The Honorable	Dean	Martin	State Treasurer	State of Arizona		1700 West Washington Street, 1st Floor	Phoenix	Arizona	85007
The Honorable	Rick	Mueller		Mayor of Sierra Vista		1011 North Coronado Drive	Sierra Vista	Arizona	85635
The Honorable	Richard	Fimbres	Councilmember	City of Tucson	Ward 5	4300 South Park Avenue	Tucson	Arizona	85714
The Honorable	Paul	Cunningham	Councilmember	City of Tucson	Ward 2	7575 East Speedway	Tucson	Arizona	85710
The Honorable	Steve	Kozachik	Councilmember	City of Tucson	Ward 6	3202 East 1st Street	Tucson	Arizona	85716
Mr.	Mike	Letcher	City Manager	City of Tucson		255 West Alameda Street	Tucson	Arizona	85701
The Honorable	Regina	Romero	Councilmember	City of Tucson	Ward 1	940 West Alameda Street	Tucson	Arizona	85745
The Honorable	Shirley	Scott	Councilmember	City of Tucson	Ward 4	8123 East Poinciana Street	Tucson	Arizona	85730
The Honorable	Karin	Uhlich		Vice Mayor of Tucson	Ward 3	1510 East Grant Road	Tucson	Arizona	85719
The Honorable	Jonathan	Rothschild		Mayor of Tucson		255 West Alameda Street	Tucson	Arizona	85701
Sheriff	Clarence	Dupnik	Sheriff	Pima County Sheriff's Department		1750 East Benson Highway	Tucson	Arizona	85714
Mr.	C. H.	Huckelberry	County Administrator	Pima County		130 West Congress Street	Tucson	Arizona	85701
Mr.	Fritz	Behring	County Manager	Pinal County		31 North Pinal Street	Florence	Arizona	85232
The Honorable	Ed	Honea		Mayor of Marana		11555 West Civic Center Drive	Marana	Arizona	85653
The Honorable	Satish	Hiremath		Mayor of Oro Valley		11000 North La Canada Drive	Oro Valley	Arizona	85737
The Honorable	Duane	Blumberg		Mayor of Sahuarita		375 West Sahuarita Center Way	Sahuarita	Arizona	85629

Table A.4–19. Tucson U.S. Fish and Wildlife Service (Endangered Species Act) Mailing List

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Ms.	Sherry	Barrett	Assistant Field Supervisor	United States Fish and Wildlife Service - Arizona Ecological Services	201 North Bonita, Suite 141	Tucson	Arizona	85745

Table A.4–20. Tucson General Mailing List

Salutation	*First Name*	*Last Name*	*Title*	*Organization*	*Street*	*City*	*State*	*Zip*
Colonel	Michael T.	McGuire	Colonel	162nd Fighter Wing	1650 East Perimeter Way	Tucson	Arizona	85706
Mr.	Tim	Amalong	President	162nd Fighter Wing Minuteman Committee	6971 South Apron Drive	Tucson	Arizona	85756
Major	Gabriel	Johnson	Public Affairs	162nd Fighter Wing Public Affairs Office	1650 East Perimeter Way	Tucson	Arizona	85706
Major General	Hugo	Salazar	Major General	Arizona Adjutant General	5636 East McDowell Road	Phoenix	Arizona	85008
Brigadier General	Michael	Colangelo	Brigadier General	Arizona Air National Guard Commander	5636 East McDowell Road	Phoenix	Arizona	85008
Mr.	Scott	Hines	Community Liaison	Davis-Monthan Air Force Base	5275 East Granite Street, Building 2300, Room 2062	Davis-Monthan Air Force Base	Arizona	85707
Mr.	Scott	Essex	Chair	Arizona Committee for Employer Support of the Guard and Reserve	8252 South Pecan Grove Circle	Tempe	Arizona	85284
Mr.	Bruce	Hamilton		Arizona Committee for Employer Support of the Guard and Reserve	5500 East Valencia Road	Tucson	Arizona	85706
Mr.	William G.	Valenzuela		Arizona Committee for Employer Support of the Guard and Reserve	4085 North Highway Drive	Tucson	Arizona	85705
Mr.	Darren	Venters		Arizona Committee for Employer Support of the Guard and Reserve	2436 East Desert Pueblo Pass	Green Valley	Arizona	85615
Ms.	Amy	Hammerstrom		Caballeros Del Sol	2201 East Ganley Road	Tucson	Arizona	85706
Mr.	Tom	Murphy	President	D-M 50	6057 East Grant Road	Tucson	Arizona	85712
Mr.	Hans	Boensel		Green Valley 260 Club	1909 West Mintbush Drive	Green Valley	Arizona	85622
	Executive Director			Green Valley-Sahuarita Chamber of Commerce	275 West Continental, Suite 123	Green Valley	Arizona	85622
Mr.	Jim	Click		Jim Click Automotive Team	780 West Competition Drive	Tucson	Arizona	85705
Dr.	Taylor W.	Lawrence		Raytheon Missile Systems	1151 East Hermans Road	Tucson	Arizona	85706
Mr.	Ronald E.	Shoopman	President	Southern Arizona Leadership Council	4400 East Broadway, Suite 307	Tucson	Arizona	85711
Ms.	Judy	Rich		TMC HealthCare	5301 East Grant Road	Tucson	Arizona	85712
Mr.	Mike	Varney		Tucson Chamber of Commerce	PO Box 991	Tucson	Arizona	85701
Mr.	Mike	Erickson		Tucson Chamber of Commerce, Military Affairs Committee	PO Box 991	Tucson	Arizona	85701

Salutation	First Name	Last Name	Title	Organization	Street	City	State	Zip
Ms.	Eloise	Brown		Tucson Council for International Visitors	3900 Timrod	Tucson	Arizona	85711
Mr.	Kevin	Burns		University Medical Center	1501 North Campbell Avenue	Tucson	Arizona	85724
Dr.	Eugene	Sander		University of Arizona	888 North Euclid Avenue, Suite 114	Tucson	Arizona	85721
Mr.	Robert	Ramirez		Vantage West Credit Union	2480 North Arcadia Avenue	Tucson	Arizona	85712
			Librarian	Joel D. Valdez Main Library, Reference - Government Publications	101 North Stone Avenue	Tucson	Arizona	85701

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Kathryn Vernon, Regional Administrator – Northwest Mountain Region

National Park Service
Jonathan B. Jarvis, Director
Christine Lehnertz, Regional Director – Pacific West

U.S. Army Corps of Engineers
Ellen Berggren, Project Manager – Boise Outreach Office

U.S. Bureau of Indian Affairs
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Aden Seidlitz, District Manager – Boise District
Loretta Chandler, Field Manager – Owyhee Field Office
Steven Ellis, State Director – Idaho State Office

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U.S. Department of the Interior
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U.S. Environmental Protection Agency
Lisa Jackson, Administrator
Dennis McLerran, Regional Administrator – Region 10 (ETPA-088)

U.S. Fish and Wildlife Service
Brian Kelly, State Supervisor – Department of Interior
Mark Robertson, Federal Consultation – Idaho State Office

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Dean Cameron, District 26
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Darrell Bolz, District 10, House Seat B
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Carlos Bilbao, District 11, House Seat B
Robert Schaefer, District 12, House Seat A
Gary E. Collins, District 12, House Seat B
Brent Crane, District 13, House Seat A
Christy Perry, District 13, House Seat B
Mike Moyle, District 14, House Seat A
Reed DeMordaunt, District 14, House Seat B
Lynn M. Luker, District 15, House Seat A
Max C. Black, District 15, House Seat B
Grant Burgoyne, District 16, House Seat A
Elfreda Higgins, District 16, House Seat B
William M. Killen, District 17, House Seat A
Susan B. Chew, District 17, House Seat B
Julie Ellsworth, District 18, House Seat A
Phylis K. King, District 18, House Seat B
Cherie Buckner-Webb, District 19, House Seat A
Brian Cronin, District 19, House Seat B
Joe Palmer, District 20, House Seat A
Marv Hagedorn, District 20, House Seat B
John Vander Woude, District 21, House Seat A
Clifford R. Bayer, District 21, House Seat B
Richard Wills, District 22, House Seat A
Pete Nielsen, District 22, House Seat B
Jim Patrick, District 23, House Seat A
Stephen Hartgen, District 23, House Seat B
Leon E. Smith, District 24, House Seat A
Sharon L. Block, District 24, House Seat B
Wendy Jaquet, District 25, House Seat A
Donna L. Pence, District 25, House Seat B
John A. "Burt" Stevenson, District 26, House Seat A
Maxine T. Bell, District 26, House Seat B

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Jeffery Sayer, Director, Idaho Department of Commerce
Jerry Miller, Business Development Specialist

Department of Environmental Quality
Curt Fransen, Director
Larry Koenig, State Planning and Special Projects

Department of Labor
Roger Madsen, Director
Albert Clement, Boise Office
David Hoag, Boise Office
Dave Howerton, Canyon County Office
John Russ, Manager – Meridian Office
Gary Hanna, Meridian Office

Fish & Game
Virgil Moore, Director
Eric Leitzinger, Biologist - Southwest Region

Idaho Power
Blake Watson, Representative – Community Relations

State Historical Society
Janet Gallimore, Executive Director

Transportation Department
John DeThomas, Administrator – Division of Aeronautics
Sue Sullivan, Section Manager – Environmental Headquarters

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Mark Baumler, State Historic Preservation Officer

Oregon
Susan Haylock, SHPO Compliance

Utah
Wilson G. Martin, State Historic Preservation Officer

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John Evans, Garden City
Paul Spang, City of Grand View
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Tammy de Weerd, City of Meridian
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The Honorable Tom Dale, City of Nampa

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Kathy Alder, District 2
David Ferdinand, District 3

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Wes Wootan

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Kelly Aberasturi, Commissioner, District 2
Joe Merrick, Commissioner, District 3

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Meridian City Council
Brad Hoaglun, President, Meridian City Council

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Hal Simmons, Director, City of Boise Planning and Zoning
Jill Singer, City of Boise, Boise Airport
Kenny Bowers, Meridian Fire Department

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Phillip Del Rosa, Chairman

Burns Paiute Tribe
Diane Teeman, Tribal Chair

Cedarville Rancheria
Cherie Rhoades, Chairperson

Fort Bidwell Indian Community
Bernold Pollard, Chairman, Fort Bidwell Reservation

Fort McDermitt Paiute and Shoshone Tribe
Billy Bell, Chairman

Modoc (Klamath Tribes)
Gary Frost, Chairman, Klamath General Council

Nez Perce Tribe
Brooklyn Baptiste, Chairman, Nez Perce Tribal Executive Committee

Northwestern Band, Shoshone
Bruce Parry, Chairman

Pit River Tribe
Juan Venegas, Chairman, Pit River Tribal Council

Shoshone-Bannock Tribes
Nathan Small, Chairman

Shoshone-Paiute Tribes of Duck Valley
Terry Gibson, Chairman

Summit Lake Paiute Tribe
Warner Barlese, Chairman, Summit Lake Paiute Council

ORGANIZATIONS/INTERESTED PARTIES

Other Organizations/Interested Parties
Rickey Forbus, BSA Troop 123
Shirl Boyce, Director of Advancement, College of Western Idaho
Larry Kalousek, CSHQA
Jeff Shneider, President, CSHQA
Katie Fite, Western Watershed Project
Jim Rosetti, DAV/VFW
Zach Hall, HDR Engineering
Dennis Trumble, Idaho Power
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Miguel Legarreta, Realtors Association

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Nan Terry, Environmental Specialist
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National Park Service
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Julie Sharp, Planning/Environmental Quality Technician – Intermountain Region
Nancy Skinner, Superintendent – Fossil Butte
Glen Fulfer, Superintendent – Salinas Monument

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Sharon Pinto, Regional Director – Navajo Regional Agency
Effie Delmar, Natural Resources Manager – Navajo Region Eastern Navajo Agency
Calvert Curley, Natural Resources Manager – Navajo Region Ft. Defiance Agency
Superintendent, Southwest Region Mescalero Agency
Anna Mae Pino, Superintendent, Southwest Region Ramah Navajo Agency

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Tom Dabbs, District Manager – Gila District Office
Bill Childress, District Manager – Las Cruces District Office
Jesse Juen, Acting State Director – New Mexico State Office
Doug Burger, District Manager – Pecos District Office
Chuck Schmidt, Field Manager – Roswell Field Office
Scott Cooke, Field Manager – Safford Field Office
Danita Burns, Field Manager – Socorro Field Office

U.S. Bureau of Reclamation
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Wes Able, Facilities Coordination Specialist – Carlsbad Office
Lorri Gray, Regional Director – Lower Colorado Regional Office
Bobby Clark, Manager – Socorro Field Division
Larry Walkoviak, Regional Director – Upper Colorado Regional Office

U.S. Department of Agriculture, Forest Service
Corbin Newman, Regional Forester
Robert Trujillo, Forest Supervisor – Lincoln National Forest

U.S. Department of Defense
Lisa Blevins, White Sands Missile Range Public Affairs Office

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Stephen Spencer, Environmental Officer – Regional Environmental Office

U.S. Environmental Protection Agency
Alfredo Armendariz, Regional Administrator – Region 6
Joyce Stubblefield – Region 6 Office of Planning and Coordination

U.S. Fish and Wildlife Service
Kevin Cobble, Refuge Manager – San Andres NWR
Wally Murphy, Acting Field Supervisor – New Mexico Ecological Services
Dr. Benjamin Tuggle, Regional Director – Region 2

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Stephen H. Fischmann, District 37
Mary Kay Papen, District 38
William F. Burt, District 40
Gay Kernan, District 42

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Rhonda King, District 50
Yvette Herrell, District 51
Rick Little, District 53
William Gray, District 54
Zachary Cook, District 56
Dennis Kintigh, District 57
Candy Spence Ezzell, District 58
Nora Espinoza, District 59
George Dodge, District 63
Bob Wooley, District 66
Richard Vigil, District 70

Agencies

Department of Energy, Minerals and Natural Resources
Bob Sivinski

Department of Game and Fish
Tod Stevenson, Director
Matt Wunder, Division Chief – Conservation Services Division

Department of Parks and Recreation
Director, New Mexico Department of Parks and Recreation

Department of Transportation
Don Abeyta, District 6 Business Manager
Miguel Gabaldon, District 5 Engineer
Frank Guzman, District Engineer, District 1
Debra Hicks, Commissioner, District 2
Gary Shubert, District Engineer, District 2
Jackson Gibson, Commissioner, District 6
Larry Maynard, District Engineer, District 6

Farm and Livestock
Manager, New Mexico Farm and Livestock

STATE HISTORIC PRESERVATION REPRESENTATIVES

New Mexico

Jan V. Biella, State Historic Preservation Officer
Sam Cata, Deputy Director – Department of Cultural Affairs
Dr. Kristine Johnson, Program Zoologist – State Heritage Program

Texas

Mark Wolfe, State Historic Preservation Officer

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Ken Miyagishima, City of Las Cruces
Del Jurney, City of Roswell
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Lori Montgomery, City of Truth or Consequences
Mike Petty, Town of Carrizozo
Nora Barraza, Town of Mesilla
Chester Riley, Town of Mountainair
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Appendix B
Noise

Appendix B. Noise

Appendix B provides a general noise primer to educate the reader on what constitutes noise, how it is measured, and the studies that were used in support of how and why noise is modeled.

Noise is generally described as unwanted sound. Unwanted sound can be based on objective effects (such as hearing loss or damage to structures) or subjective judgments (community annoyance). Noise analysis thus requires a combination of physical measurement of sound, physical and physiological effects, plus psycho- and socio-acoustic effects.

Section 1.0 of this appendix describes how sound is measured and summarizes noise impacts in terms of community acceptability and land use compatibility. Section 2.0 gives detailed descriptions of the effects of noise that lead to the impact guidelines presented in Section 1.0. Section 3.0 provides a description of the specific methods used to predict aircraft noise, including a detailed description of sonic booms.

B.1 Noise Descriptors and Impact

Aircraft operating in military airspace generate two types of sound. One is "subsonic" noise, which is continuous sound generated by the aircraft's engines and also by air flowing over the aircraft itself. The other is sonic booms (where authorized for supersonic), which are transient impulsive sounds generated during supersonic flight. These are quantified in different ways.

Section 1.1 describes the characteristics which are used to describe sound. Section 1.2 describes the specific noise metrics used for noise impact analysis. Section 1.3 describes how environmental impact and land use compatibility are judged in terms of these quantities.

B.1.1 Quantifying Sound

Measurement and perception of sound involve two basic physical characteristics: amplitude and frequency. Amplitude is a measure of the strength of the sound and is directly measured in terms of the pressure of a sound wave. Because sound pressure varies in time, various types of pressure averages are usually used. Frequency, commonly perceived as pitch, is the number of times per second the sound causes air molecules to oscillate. Frequency is measured in units of cycles per second, or hertz (Hz).

Amplitude. The loudest sounds the human ear can comfortably hear have acoustic energy one trillion times the acoustic energy of sounds the ear can barely detect. Because of this vast range, attempts to represent sound amplitude by pressure are generally unwieldy. Sound is, therefore, usually represented on a logarithmic scale with a unit called the decibel (dB). Sound measured on the decibel scale is referred to as a sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Because of the logarithmic nature of the decibel scale, sounds levels do not add and subtract directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example:

60 dB + 60 dB = 63 dB, and

80 dB + 80 dB = 83 dB.

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

60.0 dB + 70.0 dB = 70.4 dB.

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as "decibel addition" or "energy addition." The latter term arises from the fact that the combination of decibel values consists of first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

The difference in dB between two sounds represents the ratio of the amplitudes of those two sounds. Because human senses tend to be proportional (i.e., detect whether one sound is twice as big as another) rather than absolute (i.e., detect whether one sound is a given number of pressure units bigger than another), the decibel scale correlates well with human response.

Under laboratory conditions, differences in sound level of 1 dB can be detected by the human ear. In the community, the smallest change in average noise level that can be detected is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds. A decrease in sound level of 10 dB actually represents a 90 percent decrease in sound *intensity* but only a 50 percent decrease in perceived *loudness* because of the nonlinear response of the human ear (similar to most human senses).

The one exception to the exclusive use of levels, rather than physical pressure units, to quantify sound is in the case of sonic booms. As described in Section 3.2, sonic booms are coherent waves with specific characteristics. There is a long-standing tradition of describing individual sonic booms by the amplitude of the shock waves, in pounds per square foot (psf). This is particularly relevant when assessing structural effects as opposed to loudness or cumulative community response. In this environmental analysis, sonic booms are quantified by either dB or psf, as appropriate for the particular impact being assessed.

Frequency. The normal human ear can hear frequencies from about 20 Hz to about 20,000 Hz. It is most sensitive to sounds in the 1,000 to 4,000 Hz range. When measuring community response to noise, it is common to adjust the frequency content of the measured sound to correspond to the frequency sensitivity of the human ear. This adjustment is called A-weighting (ANSI 1988). Sound levels that have been so adjusted are referred to as A-weighted sound levels.

The audible quality of high thrust engines in modern military combat aircraft can be somewhat different than other aircraft, including (at high throttle settings) the characteristic nonlinear crackle of high thrust engines. The spectral characteristics of various noises are accounted for by A-weighting, which approximates the response of the human ear but does not necessarily account for quality. There are other, more detailed, weighting factors that have been applied to sounds. In the 1950s and 1960s, when noise from civilian jet aircraft became an issue, substantial research was performed to determine what characteristics of jet noise were a problem. The metrics Perceived Noise Level and Effective Perceived Noise Level were developed. These accounted for nonlinear behavior of hearing and the importance of low frequencies at high levels, and for many years airport/airbase noise contours were presented in terms of Noise Exposure Forecast, which was based on Perceived Noise Level and Effective Perceived Noise Level. In the 1970s, however, it was realized that the primary intrusive aspect of aircraft noise was the high noise level, a factor which is well represented by A-weighted levels and day–night average sound level (DNL). The refinement of Perceived Noise Level, Effective Perceived Noise Level, and Noise Exposure Forecast was not significant in protecting the public from noise.

There has been continuing research on noise metrics and the importance of sound quality, sponsored by the U.S. Department of Defense (DoD) for military aircraft noise and by the

Federal Aviation Administration (FAA) for civil aircraft noise. The metric L_{dnmr}, which is described later and accounts for the increased annoyance of rapid onset rate of sound, is a product of this long-term research.

The amplitude of A-weighted sound levels is measured in dB. It is common for some noise analysts to denote the unit of A-weighted sounds by dBA. As long as the use of A-weighting is understood, there is no difference between dB or dBA: it is only important that the use of A-weighting be made clear. In this environmental analysis, A-weighted sound levels are reported as dB.

A-weighting is appropriate for continuous sounds, which are perceived by the ear. Impulsive sounds, such as sonic booms, are perceived by more than just the ear. When experienced indoors, there can be secondary noise from rattling of the building. Vibrations may also be felt. C-weighting (ANSI 1988) is applied to such sounds. This is a frequency weighting that is relatively flat over the range of human hearing (about 20 Hz to 20,000 Hz) that rolls off above 5,000 Hz and below 50 Hz. In this study, C-weighted sound levels are used for the assessment of sonic booms and other impulsive sounds. As with A-weighting, the unit is dB, but dBC is sometimes used for clarity. In this study, sound levels are reported in both A-weighting and C-weighting dBs, and C-weighted metrics are denoted when used.

Time Averaging. Sound pressure of a continuous sound varies greatly with time, so it is customary to deal with sound levels that represent averages over time. Levels presented as instantaneous (i.e., as might be read from the display of a sound level meter) are based on averages of sound energy over either 1/8 second (fast) or 1 second (slow). The formal definitions of fast and slow levels are somewhat complex, with details that are important to the makers and users of instrumentation. They may, however, be thought of as levels corresponding to the root mean-square sound pressure measured over the 1/8-second or 1-second periods.

The most common uses of the fast or slow sound level in environmental analysis is in the discussion of the maximum sound level that occurs from the action, and in discussions of typical sound levels. Figure B–1 is a chart of A-weighted sound levels from typical sounds. Some (air conditioner, vacuum cleaner) are continuous sounds whose levels are constant for some time. Some (automobile, heavy truck) are the maximum sound during a vehicle passby. Some (urban daytime, urban nighttime) are averages over some extended period. A variety of noise metrics have been developed to describe noise over different time periods. These are described in Section B.1.2.

B.1.2 Noise Metrics

B.1.2.1 Maximum Sound Level

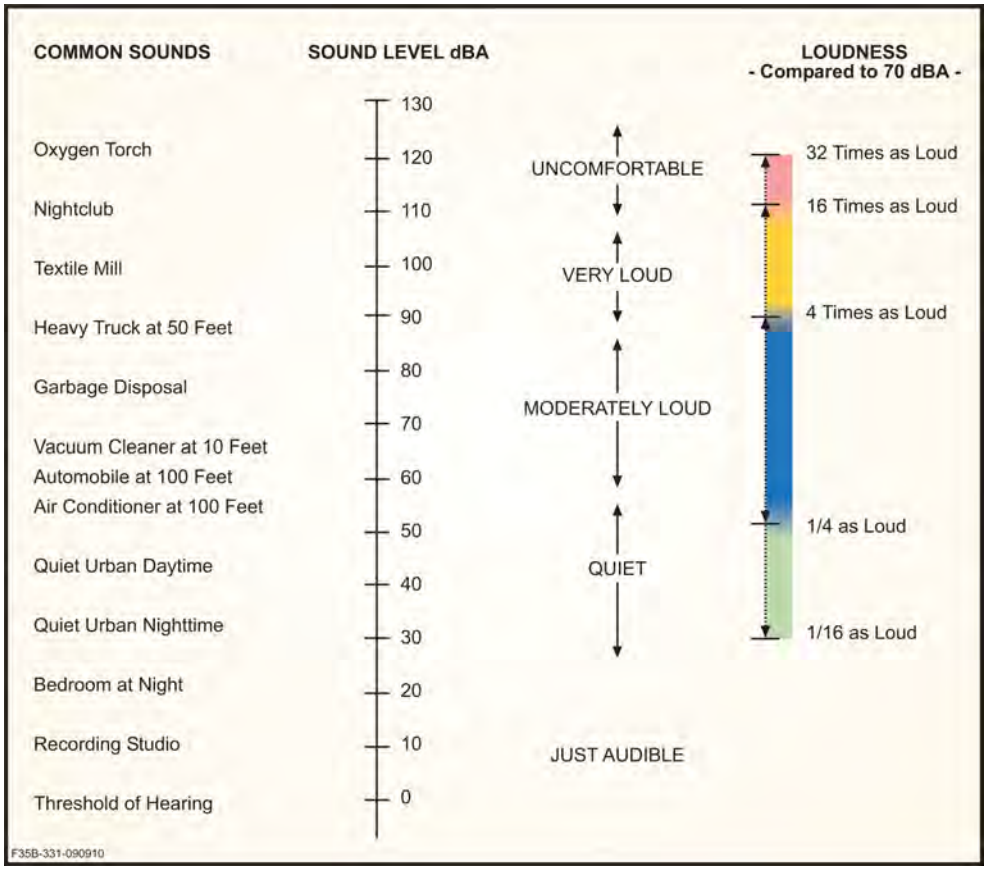
The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, L_{max}, or L_{Amax}. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleeping, or other common activities. Table B–1 reflects L_{max} values for typical aircraft associated with this assessment operating at the indicated flight profiles and power settings.

Table B–1. Representative Maximum Sound Levels (L_{max})

Aircraft (engine type)	*Power Setting*	*Power Unit*	*L_{max} Values (in dBA) At Varying Distances (In Feet)*				
			500	**1,000**	**2,000**	**5,000**	**10,000**
Takeoff/Departure Operations (at 300 knots airspeed)							
F-35A	100%	ETR	124.0	115.2	105.9	93.5	83.4
F-4C	100%	RPM	117.3	109.7	101.2	88.5	76.9
F-18 E/F	96%	NC	119.7	112.4	104.5	92.4	81.5
A-10A	6200	NF	99.9	91.7	82.2	68.2	57.8
B-1	97.5%	RPM	126.5	118.3	109.9	98.3	88.7
F-15 (P220)	90%	NC	111.4	104.3	96.6	85.0	74.7
F-16 (P229)	93%	NC	113.7	106.2	98.1	86.1	75.7
F-22	100%	ETR	119.7	112.4	104.6	93.0	82.9
Landing/Arrival Operations (at 160 knots airspeed)							
F-35A	40%	ETR	101.7	94.8	87.4	76.1	66.2
F-4C	87%	RPM	106.3	99.1	91.3	79.3	68.7
F-18 E/F	84%	NC	113.4	106.2	98.3	86.0	74.9
A-10A	5225	NF	97.0	88.9	78.8	60.2	46.4
B-1	90%	RPM	98.8	91.9	84.5	72.8	62.0
F-15 (P220)	75%	NC	88.5	81.6	74.3	63.2	53.4
F-16 (P229)	83.5%	NC	92.6	85.5	77.8	66.1	55.6
F-22	43%	ETR	111.3	103.9	95.9	83.9	73.1

Key: Engine Unit of Power: RPM=Revolutions Per Minute; ETR=Engine Thrust Request; NC=Engine Core RPM; and NF=Engine Fan RPM.

Source: SELCalc2 (Flyover Noise Calculator), Using NoiseMap 6/7 and Maximum Omega10 Result as the defaults.



Source: Derived from the *Handbook of Noise Control*, Harris 1979, FICAN 1997.

Figure B–1. Typical A-Weighted Sound Levels of Common Sounds

B.1.2.2 Sound Exposure Level

Individual time-varying noise events have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. Although the maximum sound level reached during the event provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The Sound Exposure Level (abbreviated SEL or L_{AE} for A weighted sounds) combines both of these characteristics into a single metric.

SEL is a composite metric that represents both the intensity of a sound and its duration. Mathematically, the mean square sound pressure is computed over the duration of the event, then multiplied by the duration in seconds, and the resultant product is turned into a sound level. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level. Table B–2 shows SEL values corresponding to the aircraft and power settings reflected in Table B–1.

Table B–2. Representative Sound Exposure Levels (SEL)

Aircraft (engine type)	*Power Setting*	*Power Unit*	*SEL Values (in dBA) At Varying Distances (In Feet)*				
			500	**1,000**	**2,000**	**5,000**	**10,000**
Takeoff/Departure Operations (at 300 knots airspeed)							
F-35A	100%	ETR	125.0	118.1	110.5	100.5	92.3
F-4C	100%	RPM	121.5	115.7	109.0	98.8	88.9
F-18 E/F	96%	NC	121.6	116.1	110.0	100.3	91.3
A-10A	6200	NF	102.6	96.2	88.5	76.9	68.3
B-1	97.5%	RPM	129.5	123.1	116.5	107.3	99.3
F-15 (P220)	90%	NC	117.3	112.0	106.1	97.0	88.4
F-16 (P229)	93%	NC	116.5	110.8	104.6	95.0	86.3
F-22	100%	ETR	124.2	118.7	112.7	103.5	95.2
Landing/Arrival Operations (at 160 knots airspeed)							
F-35A	40%	ETR	104.7	99.6	93.9	85.1	77.0
F-4C	87%	RPM	113.0	105.9	99.9	90.3	81.5
F-18 E/F	84%	NC	116.4	111.0	104.9	95.0	85.8
A-10A	5225	NF	97.9	91.5	83.3	67.0	55.0
B-1	90%	RPM	103.4	98.3	92.7	83.4	74.4
F-15 (P220)	75%	NC	94.2	89.2	83.6	74.9	66.9
F-16 (P229)	83.5%	NC	97.4	92.1	86.3	76.9	68.2
F-22	43%	ETR	114.9	109.3	103.1	93.5	84.5

Key: Engine Unit of Power: RPM=Revolutions Per Minute; ETR=Engine Thrust Request; NC=Engine Core RPM; and NF=Engine Fan RPM.
Source: SELCalc2 (Flyover Noise Calculator), Using NoiseMap 6/7 and Maximum Omega10 Result as the defaults.

Because the SEL and the maximum sound level are both used to describe single events, there is sometimes confusion between the two, so the specific metric used should be clearly stated.

SEL can be computed for C-weighted levels (appropriate for impulsive sounds), and the results denoted CSEL or L_{CE}. SEL for A-weighted sound is sometimes denoted ASEL. Within this study, SEL is used for A weighted sounds and CSEL for C-weighted.

B.1.2.3 Equivalent Sound Level

For longer periods of time, total sound is represented by the equivalent continuous sound pressure level (L_{eq}). L_{eq} is the average sound level over some time period (often an hour or a day, but any explicit time span can be specified), with the averaging being done on the same energy basis as used for SEL. SEL and L_{eq} are closely related, with L_{eq} being SEL over some time period normalized by that time.

Just as SEL has proven to be a good measure of the noise impact of a single event, L_{eq} has been established to be a good measure of the impact of a series of events during a given time period. Also, while L_{eq} is defined as an average, it is effectively a sum over that time period and is, thus, a measure of the cumulative impact of noise.

B.1.2.4 Day–Night Average Sound Level

Noise tends to be more intrusive at night than during the day. This effect is accounted for by applying a 10 dB penalty to events that occur after 10 pm and before 7 am. If L_{eq} is computed over a 24-hour period with this nighttime penalty applied, the result is the DNL. DNL is the community noise metric recommended by the U.S. Environmental Protection Agency (EPA) (EPA 1974) and has been adopted by most Federal agencies (FICON 1992). It has been well established that DNL correlates well with long-term community response to noise (Schultz 1978, Finegold et al. 1994). This correlation is presented in Section 1.3 of this appendix.

DNL accounts for the total, or cumulative, noise impact at a given location, and for this reason is often referred to as a "cumulative" metric. It was noted earlier that, for impulsive sounds, such as sonic booms, C-weighting is more appropriate than A-weighting. DNL computed with C-weighting is denoted CDNL or L_{Cdn}. This procedure has been standardized, and impact interpretive criteria similar to those for DNL have been developed (CHABA 1981).

B.1.2.5 Onset-Adjusted Monthly Day–Night Average Sound Level

Aircraft operations in military training airspace generate a noise environment somewhat different from other community noise environments. Overflights are sporadic, occurring at random times and varying from day to day and week to week. This situation differs from most community noise environments, in which noise tends to be continuous or patterned. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset.

To represent these differences, the conventional DNL metric is adjusted to account for the "surprise" effect of the sudden onset of aircraft noise events on humans (Plotkin et al. 1987; Stusnick et al. 1992, 1993). For aircraft exhibiting a rate of increase in sound level (called onset rate) of from 15 to 150 dB per second, an adjustment or penalty ranging from 0 to 11 dB is added to the normal SEL. Onset rates above 150 dB per second require an 11 dB penalty, while onset rates below 15 dB per second require no adjustment. The DNL is then determined in the same

manner as for conventional aircraft noise events and is designated as onset-rate adjusted day–night average sound level (abbreviated L_{dnmr}).

Because of the irregular occurrences of aircraft operations, the number of average daily operations is determined by using the calendar month with the highest number of operations. The monthly average is denoted L_{dnmr}. Noise levels are calculated the same way for both DNL and L_{dnmr}. L_{dnmr} is interpreted by the same criteria as used for DNL.

B.1.2.6 Number-of-Events Above a Threshold Level

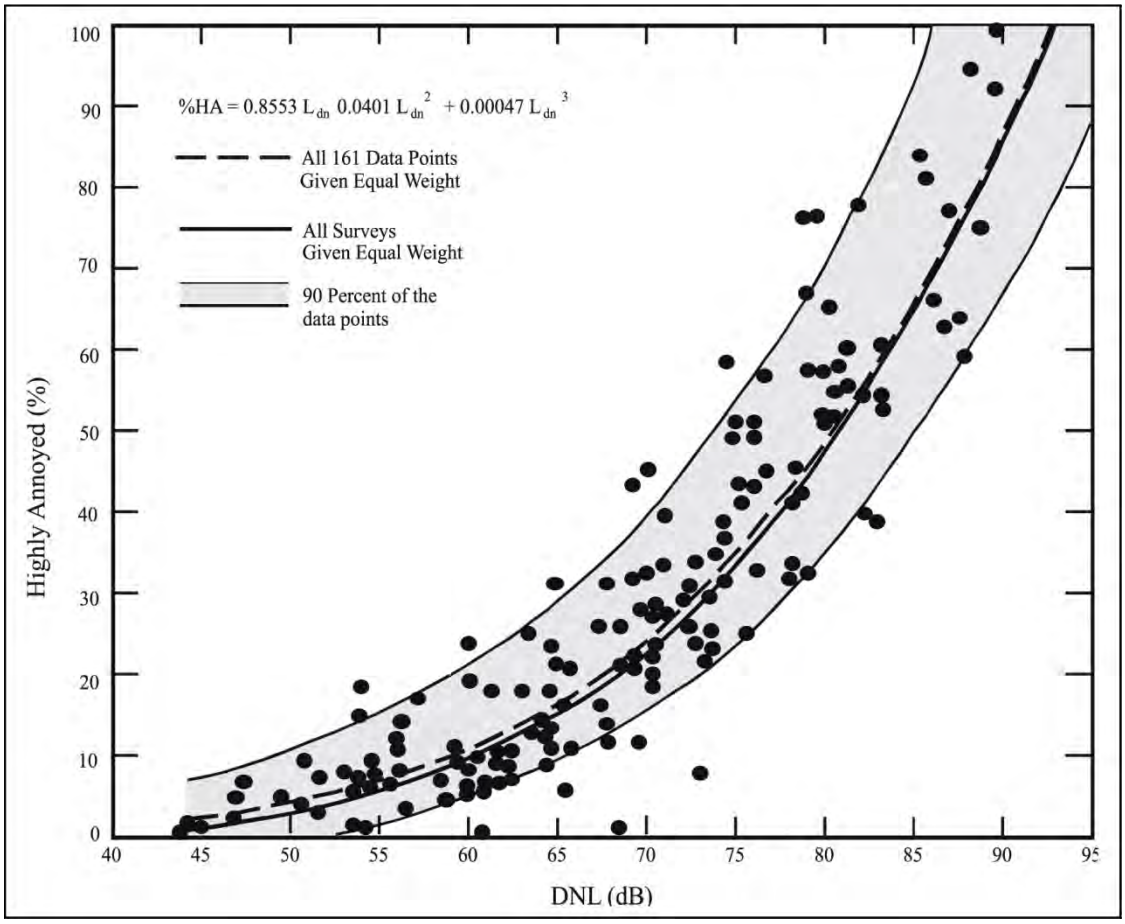
The Number-of-events Above metric (NA) provides the total number of noise events that exceed the selected noise level threshold during a specified period of time. Combined with the selected threshold level (L), the NA metric is symbolized as NAL. The threshold L can be defined in terms of either the SEL or L_{max} metric, and it is important that this selection is reflected in the nomenclature. When labeling a contour line or point of interest (POI) on a map the NAL will be followed by the number of events in parentheses for that line or POI. For example, the noise environment at a location where 10 events exceed an SEL of 90 dB, over a given period of time, would be represented by the nomenclature NA90SEL (10). Similarly, for L_{max} it would be NA90L_{max} (10). The period of time can be an average 24 hour day, daytime, nighttime, school day, or any other time period appropriate to the nature and application of the analysis.

NA can be portrayed for single or multiple locations, or by means of noise contours on a map similar to the common DNL contours. A threshold level is selected that best meets the need for that situation. An L_{max} threshold is normally selected to analyze speech interference, whereas an SEL threshold is normally selected for analysis of sleep disturbance. The NA metric is the only supplemental metric that has been developed that combines single-event noise levels with the number of aircraft operations. In essence, it answers the question of how many aircraft (or range of aircraft) fly over a given location or area at or above a selected threshold noise level.

B.1.3 Noise Impact

B.1.3.1 Community Reaction

Studies of long-term community annoyance to numerous types of environmental noise show that DNL correlates well with the annoyance. Schultz (1978) showed a consistent relationship between DNL and annoyance. Shultz's original curve fit (Figure B–2) shows that there is a remarkable consistency in results of attitudinal surveys which relate the percentages of groups of people who express various degrees of annoyance when exposed to different DNL.



Source: Schultz 1978.

Figure B–2. Community Surveys of Noise Annoyance

Another study reaffirmed this relationship (Fidell et al. 1989). Figure B–3 shows an updated form of the curve fit (Finegold et al. 1994) in comparison with the original. The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors that influence the manner in which individuals react to noise. For example, individuals with autism are often very strongly affected by sudden noises (Tang et al. 2002). Persons with autism often report experiencing oversensitivity to noise and are often particularly sensitive to high-pitched or sudden onset noises (Grandin 1991). Nevertheless, findings substantiate that community annoyance to aircraft noise is predicted quite reliably using DNL.

As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. DNL accounts for the sound level of individual noise events, the duration of those events, and the number of events. Its use is endorsed by the scientific community (ANSI 1980, 1988, 2005; EPA 1974; FICON 1992; FICUN 1980).

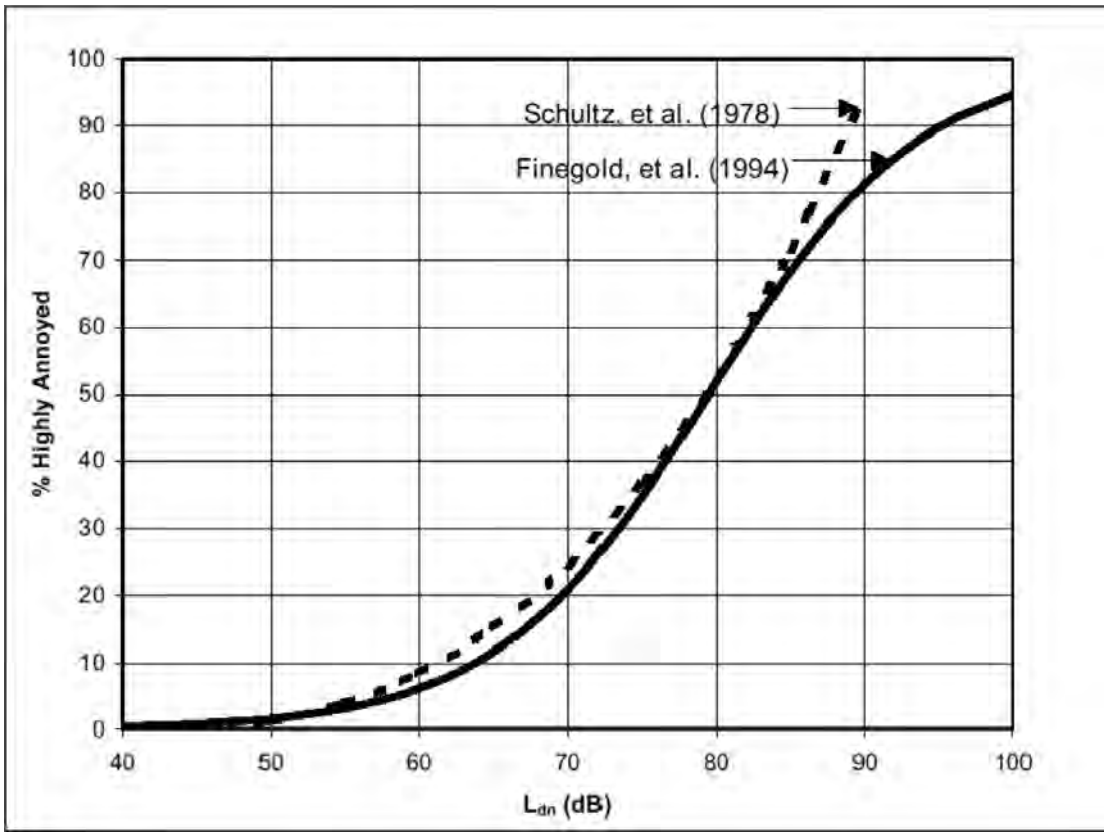


Figure B–3. Response of Communities to Noise; Comparison of Original (Schultz 1978) and Current (Finegold et al. 1994) Curve Fits

While DNL is the best metric for quantitatively assessing cumulative noise impact, it does not lend itself to intuitive interpretation by non-experts. Accordingly, it is common for environmental noise analyses to include other metrics for illustrative purposes. A general indication of the noise environment can be presented by noting the maximum sound levels which can occur and the number of times per day noise events will be loud enough to be heard. Use of other metrics as supplements to DNL has been endorsed by Federal agencies (FICON 1992).

The Schultz curve is generally applied to annual average DNL. In Section 1.2, L_{dnmr} was described and presented as being appropriate for quantifying noise in military airspace. The Schultz curve is used with L_{dnmr} as the noise metric. L_{dnmr} is always equal to or greater than DNL, so impact is generally higher than would have been predicted if the onset rate and busiest-month adjustments were not accounted for.

There are several points of interest in the noise-annoyance relation. The first is DNL of 65 dB. This is a level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like aviation which do cause noise. Areas exposed to DNL above 65 dB are generally not considered suitable for residential use. The second is DNL of 55 dB, which was identified by EPA as a level "...requisite to protect the public health and welfare with an adequate margin of safety," (EPA 1974) which is essentially a level below which adverse impact is not expected. The third is DNL of 75 dB. This is the lowest

level at which adverse health effects could be credible (EPA 1974). The very high annoyance levels correlated with DNL of 75 dB make such areas unsuitable for residential land use.

Sonic boom exposure is measured by C-weighting, with the corresponding cumulative metric being CDNL. Correlation between CDNL and annoyance has been established, based on community reaction to impulsive sounds (CHABA 1981). Values of the C weighted equivalent to the Schultz curve are different than that of the Schultz curve itself. Table B–3 shows the relation between annoyance, DNL, and CDNL.

Table B–3. Relation Between Annoyance, DNL and CDNL

DNL	*% Highly Annoyed*	*CDNL*
45	0.83	42
50	1.66	46
55	3.31	51
60	6.48	56
65	12.29	60
70	22.10	65

Interpretation of CDNL from impulsive noise is accomplished by using the CDNL versus annoyance values in Table B–3. CDNL can be interpreted in terms of an "equivalent annoyance" DNL. For example, CDNL of 52, 61, and 69 dB are equivalent to DNL of 55, 65, and 75 dB, respectively. If both continuous and impulsive noise occurs in the same area, impacts are assessed separately for each.

B.1.3.2 Land Use Compatibility

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL or L_{dnmr} for military overflights. Impulsive noise can be assessed by relating CDNL to an "equivalent annoyance" DNL, as outlined in Section B1.3.1.

In June 1980, an ad hoc Federal Interagency Committee on Urban Noise published guidelines (FICUN 1980) relating DNL to compatible land uses. This committee was composed of representatives from DoD, Transportation, and Housing and Urban Development; EPA; and the Veterans Administration. Since the issuance of these guidelines, Federal agencies have generally adopted these guidelines for their noise analyses.

Following the lead of the committee, DoD and FAA adopted the concept of land-use compatibility as the accepted measure of aircraft noise effect. The FAA included the committee's guidelines in the Federal Aviation Regulations (DOT 1984). These guidelines are reprinted in Table B–4, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (note the footnote "*" in the table), they provide the best means for determining noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor DNL values above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions. In some cases a change in noise level, rather than an absolute threshold, may be a more appropriate measure of impact.

Table B–4. Land Use Compatibility, Noise Exposure, and Accident Potential

Land Use		*Accident Potential Zones*			*Noise Zones*			
SLUCM No.	**Name**	**Clear Zone**	**APZ I**	**APZ II**	**65-69 dB**	**70-74 dB**	**75-79 dB**	**80+ dB**
10	**Residential**							
11	Household units							
11.11	Single units; detached	N	N	Y[1]	A[11]	B[11]	N	N
11.12	Single units; semidetached	N	N	N	A[11]	B[11]	N	N
11.13	Singe units; attached row	N	N	N	A[11]	B[11]	N	N
11.21	Two units; side-by-side	N	N	N	A[11]	B[11]	N	N
11.22	Two units; one above the other	N	N	N	A[11]	B[11]	N	N
11.31	Apartments; walk up	N	N	N	A[11]	B[11]	N	N
11.32	Apartments; elevator	N	N	N	A[11]	B[11]	N	N
12	Group quarters	N	N	N	A[11]	B[11]	N	N
13	Residential hotels	N	N	N	A[11]	B[11]	N	N
14	Mobile home parks or courts	N	N	N	N	N	N	N
15	Transient lodgings	N	N	N	A[11]	B[11]	C[11]	N
16	Other residential	N	N	N[1]	A[11]	B[11]	N	N
20	**Manufacturing**							
21	Food and kindred products; manufacturing	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
22	Textile mill products; manufacturing	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
23	Apparel and other finished products made from fabrics, leather, and similar materials; manufacturing	N	N	N[2]	Y	Y[12]	Y[13]	Y[14]
24	Lumber and wood products (except furniture); manufacturing	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
25	Furniture and fixtures; manufacturing	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
26	Paper and allied products; manufacturing	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
27	Printing, publishing, and allied industries	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
28	Chemicals and allied products; manufacturing	N	N	N[2]	Y	Y[12]	Y[13]	Y[14]
29	Petroleum refining and related industries	N	N	N	Y	Y[12]	Y[13]	Y[14]
30	**Manufacturing**							
31	Rubber and misc. plastic products, manufacturing	N	N[2]	N[2]	Y	Y[12]	Y[13]	Y[14]
32	Stone, clay and glass products; manufacturing	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
33	Primary metal industries	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
34	Fabricated metal products; manufacturing	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks; manufacturing	N	N	N[2]	Y	A	B	N
39	Miscellaneous manufacturing	N	Y[2]	Y[2]	Y	Y[12]	Y[13]	Y[14]

Land Use		*Accident Potential Zones*			*Noise Zones*			
SLUCM No.	**Name**	**Clear Zone**	**APZ I**	**APZ II**	**65-69 dB**	**70-74 dB**	**75-79 dB**	**80+ dB**
40	**Transportation, communications, and utilities**							
41	Railroad, rapid rail transit, and street railroad transportation	N[3]	Y[4]	Y	Y	Y[12]	Y[13]	Y[14]
42	Motor vehicle transportation	N[3]	Y	Y	Y	Y[12]	Y[13]	Y[14]
43	Aircraft transportation	N[3]	Y[4]	Y	Y	Y[12]	Y[13]	Y[14]
44	Marine craft transportation	N[3]	Y[4]	Y	Y	Y[12]	Y[13]	Y[14]
45	Highway and street right-of-way	N[3]	Y	Y	Y	Y[12]	Y[13]	Y[14]
46	Automobile parking	N[3]	Y[4]	Y	Y	Y[12]	Y[13]	Y[14]
47	Communications	N[3]	Y[4]	Y	Y	A[15]	B[15]	N
48	Utilities	N[3]	Y[4]	Y	Y	Y	Y[12]	Y[13]
49	Other transportation communications and utilities	N[3]	Y[4]	Y	Y	A[15]	B[15]	N
50	**Trade**							
51	Wholesale trade	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
52	Retail trade-building materials, hardware and farm equipment	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
53	Retail trade-general merchandise	N[2]	N[2]	Y[2]	Y	A	B	N
54	Retail trade-food	N[2]	N[2]	Y[2]	Y	A	B	N
55	Retail trade-automotive, marine craft, aircraft and accessories	N[2]	N[2]	Y[2]	Y	A	B	N
56	Retail trade-apparel and accessories	N[2]	N[2]	Y[2]	Y	A	B	N
57	Retail trade-furniture, home furnishings and equipment	N[2]	N[2]	Y[2]	Y	A	B	N
58	Retail trade-eating and drinking establishments	N	N	N[2]	Y	A	B	N
59	Other retail trade	N	N[2]	Y[2]	Y	A	B	N
60	**Services**							
61	Finance, insurance, and real estate services	N	N	Y[6]	Y	A	B	N
62	Personal services	N	N	Y[6]	Y	A	B	N
62.4	Cemeteries	N	Y[7]	Y[7]	Y	Y[12]	Y[13]	Y[14,2,1]
63	Business services	N	Y[8]	Y[8]	Y	A	B	N
64	Repair services	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
65	Professional services	N	N	Y[6]	Y	A	B	N
65.1	Hospitals, nursing homes	N	N	N	A*	B*	N	N
65.1	Other medical facilities	N	N	N	Y	A	B	N
66	Contract construction services	N	Y[6]	Y	Y	A	B	N
67	Governmental services	N[6]	N	Y[6]	Y*	A*	B*	N
68	Educational services	N	N	N	A*	B*	N	N
69	Miscellaneous services	N	N[2]	Y[2]	Y	A	B	N
70	**Cultural, entertainment and recreational**							
71	Cultural activities (including churches)	N	N	N[2]	A*	B*	N	N
71.2	Nature exhibits	N	Y[2]	Y	Y*	N	N	N
72	Public assembly	N	N	N	Y	N	N	N
72.1	Auditoriums, concert halls	N	N	N	A	B	N	N

Land Use		*Accident Potential Zones*			*Noise Zones*			
SLUCM No.	**Name**	**Clear Zone**	**APZ I**	**APZ II**	**65-69 dB**	**70-74 dB**	**75-79 dB**	**80+ dB**
72.11	Outdoor music shell, amphitheatres	N	N	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	N	N	N	Y[17]	Y[17]	N	N
73	Amusements	N	N	Y[8]	Y	Y	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	N Y	Y[8,9,10]	Y	Y*	A*	B*	N
75	Resorts and group camps	N	N	N	Y*	Y*	N	N
76	Parks	N	Y[8]	Y[8]	Y*	Y*	N	N
79	Other cultural, entertainment, and recreation	N[9]	Y[9]	Y[9]	Y*	Y*	N	N
80	**Resources production and extraction**							
81	Agriculture (except livestock)	Y[16]	Y	Y	Y[18]	Y[19]	Y[20]	Y[20,21]
81.5 to 81.7	Livestock farming and animal breeding	N	Y	Y	Y[18]	Y[19]	Y[20]	Y[20,21]
82	Agricultural related activities	N	Y[5]	Y	Y[18]	Y[19]	N	N
83	Forestry activities and related services	N[5]	Y	Y	Y[18]	Y[19]	Y[20]	Y[20,21]
84	Fishing activities and related services	N[5]	Y[5]	Y	Y	Y	Y	Y
85	Mining activities and related services	N	Y[5]	Y	Y	Y	Y	Y
89	Other resources production and extraction	N	Y[5]	Y	Y	Y	Y	Y

[1] Suggested maximum density of 1-2 dwelling units per acre possibly increased under a Planned Unit Development where maximum lot coverage is less than 20 percent.

[2] Within each land use category, uses exist where further definition may be needed due to the variation of densities in people and structures. Shopping malls and shopping centers are considered incompatible in any APZ.

[3] The placing of structures, buildings, or above ground utility lines in the clear zone is subject to severe restrictions. In a majority of the clear zones, these items are prohibited. See AFI 32-7063 and AFI 32-1123 for specific guidance.

[4] No passenger terminals and no major above ground transmission lines in APZ I.

[5] Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.

[6] Low-intensity office uses only. Meeting places, auditoriums, etc., are not recommended.

[7] Excludes chapels.

[8] Facilities must be low intensity.

[9] Clubhouse not recommended.

[10] Areas for gatherings of people are not recommended.

[11a] Although local conditions may require residential use, it is discouraged in DNL 65-69 dB and strongly discouraged in DNL 70-74 dB. An evaluation should be conducted prior to approvals, indicating that a demonstrated community need for residential use would not be met if development were prohibited in these zones, and that there are no viable alternative locations.

[11b] Where the community determines the residential uses must be allowed, measures to achieve outdoor to indoor NLR for DNL 65-69 dB and DNL 70-74 dB should be incorporated into building codes and considered in individual approvals.

[11c] NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, and design and use of berms and barriers can help mitigate outdoor exposure, particularly from near ground level sources. Measures that reduce outdoor noise should be used whenever practical in preference to measures which only protect interior spaces.

[12] Measures to achieve the same NLR as required for facilities in the DNL 65-69 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

[13] Measures to achieve the same NLR as required for facilities in the DNL 70-74 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

[14] Measures to achieve the same NLR as required for facilities in the DNL 75-79 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

[15] If noise sensitive, use indicated NLR; if not, the use is compatible.

[16] No buildings.

[17] Land use is compatible provided special sound reinforcement systems are installed.

[18] Residential buildings require the same NLR required for facilities in the DNL 65-69 dB range.

[19] Residential buildings require the same NLR required for facilities in the DNL 70-74 dB range.

[20] Residential buildings are not permitted.

[21] Land use is not recommended. If the community decides the use is necessary, hearing protection devices should be worn by personnel.

Key:

SLUCM = Standard Land Use Coding Manual, U.S. Department of Transportation

Y = Yes; land use and related structures are compatible without restriction.

N = No; land use and related structures are not compatible and should be prohibited.

A, B, or C = Land use and related structures generally compatible; measures to achieve Noise Level Reduction of A (25 db), B (30 db), or C (35 db) should be incorporated into the design and construction of structures.

A*, B*, or C* = Land use generally compatible with Noise Level Reduction. However, measures to achieve an overall noise level reduction do not necessarily solve noise difficulties and additional evaluation is warranted. See appropriate footnotes.

* = The designation of these uses as "compatible" in this zone reflects individual Federal agency and program consideration of general cost and feasibility factors, as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, may have different concerns or goals to consider.

B.2 Noise Effects

The discussion in Section B.1.3 presented the global effect of noise on communities. The following sections describe particular noise effects. These effects include non-auditory health effects, annoyance, speech interference, sleep disturbance, noise-induced hearing impairment, noise effects on animals and wildlife, effects on property values, noise effects on structures, terrain, and cultural resources.

B.2.1 Non-auditory Health Effects

Non-auditory health effects of long-term noise exposure, where noise may act as a risk factor, have not been found to occur at levels below those protective against noise-induced hearing loss, described above. Most studies attempting to clarify such health effects have found that noise exposure levels established for hearing protection will also protect against any potential non-auditory health effects, at least in workplace conditions. The best scientific summary of these findings is contained in the lead paper at the National Institutes of Health Conference on Noise and Hearing Loss, held on January 22–24, 1990, in Washington, DC, which states "The non-auditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardiovascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an eight-hour day)" (von Gierke 1990; parenthetical wording added for clarification). At the International Congress (1988) on Noise as a Public Health Problem, most studies attempting to clarify such

health effects did not find them at levels below the criteria protective of noise-induced hearing loss; and even above these criteria, results regarding such health effects were ambiguous.

Consequently, it can be concluded that establishing and enforcing exposure levels protecting against noise-induced hearing loss would not only solve the noise-induced hearing loss problem but also any potential non-auditory health effects in the work place.

Although these findings were directed specifically at noise effects in the work place, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the non-auditory health effects of aircraft noise are ambiguous, at best, and often contradictory. Yet, even those studies which purport to find such health effects use time average noise levels of 75 dB and higher for their research.

For example, in an often-quoted paper, two University of California at Los Angeles researchers found a relation between aircraft noise levels under the approach path to Los Angeles International Airport and increased mortality rates among the exposed residents by using an average noise exposure level greater than 75 dB for the "noise-exposed" population (Meacham and Shaw 1979). Nevertheless, three other University of California at Los Angeles professors analyzed those same data and found no relation between noise exposure and mortality rates (Frerichs et al. 1980).

As a second example, two other University of California at Los Angeles researchers used this same population near Los Angeles International Airport to show a higher rate of birth defects during the period of 1970 to 1972 when compared with a control group residing away from the airport (Jones and Tauscher 1978). Based on this report, a separate group at the United States Centers for Disease Control performed a more thorough study of populations near Atlanta's Hartsfield International Airport for 1970 to 1972 and found no relation in their study of 17 identified categories of birth defects to aircraft noise levels above 65 dB (Edmonds et al. 1979).

In a review of health effects, prepared by a committee of the Health Council of The Netherlands (HCN 1996) analyzed currently available published information on this topic. The committee concluded that the threshold for possible long-term health effects was a 16 hour (6:00 a.m. to 10:00 p.m.) L_{eq} of 70 dB. Projecting this to 24 hours and applying the 10 dB nighttime penalty used with DNL, this corresponds to DNL of about 75 dB. The study also affirmed the risk threshold for hearing loss, as discussed earlier.

In summary, there is no scientific basis for a claim that potential health effects exist for aircraft time-average sound levels below 75 dB.

B.2.2 Annoyance

The primary effect of aircraft noise on exposed communities is one of annoyance. Noise annoyance is defined by the EPA as any negative subjective reaction on the part of an individual or group (EPA 1974). As noted in the discussion of DNL above, community annoyance is best measured by that metric.

Because the EPA Levels Document (EPA 1974) identified DNL of 55 dB as ". . . requisite to protect public health and welfare with an adequate margin of safety," it is commonly assumed that 55 dB should be adopted as a criterion for community noise analysis. From a noise exposure perspective, that would be an ideal selection. However, financial resources are generally not available to achieve that goal. Most agencies have identified DNL of 65 dB as a criterion which protects those most impacted by noise, and which can often be achieved on a practical basis (FICON 1992). This corresponds to about 12 percent of the exposed population being highly annoyed.

Although DNL of 65 dB is widely used as a benchmark for significant noise impact, and is often an acceptable compromise, it is not a statutory limit, and it is appropriate to consider other thresholds in particular cases. Local ordinances and regulations have been adopted by many municipal governments to prevent civilian development near military installations that would be incompatible with noise generated by military operations. The decision to adopt such measures, and the specific content of the ordinances and regulations, is up to the municipal government. In many cases, the 65 DNL noise contour line is adopted as the threshold level above which land use restrictions are invoked.

Community annoyance from sonic booms is based on CDNL, as discussed in Section 1.3. These effects are implicitly included in the "equivalent annoyance" CDNL values in Table B-3, since those were developed from actual community noise impact.

B.2.3 Speech Interference

Speech interference associated with aircraft noise is a primary cause of annoyance to individuals on the ground. The disruption of routine activities such as radio or television listening, telephone use, or family conversation gives rise to frustration and irritation. The quality of speech communication is also important in classrooms, offices, and industrial settings and can cause fatigue and vocal strain in those who attempt to communicate over the noise. Speech is an acoustic signal characterized by rapid fluctuations in sound level and frequency pattern. It is essential for optimum speech intelligibility to recognize these continually shifting sound patterns. Not only does noise diminish the ability to perceive the auditory signal, but it also reduces a listener's ability to follow the pattern of signal fluctuation. In general, interference with speech communication occurs when intrusive noise exceeds about 60 dB (FICON 1992).

Indoor speech interference can be expressed as a percentage of sentence intelligibility among two people speaking in relaxed conversation approximately 3 feet apart in a typical living room or bedroom (EPA 1974). The percentage of sentence intelligibility is a non-linear function of the (steady) indoor background A-weighted sound level. Such a curve-fit yields 100 percent sentence intelligibility for background levels below 57 dB and yields less than 10 percent intelligibility for background levels above 73 dB. The function is especially sensitive to changes in sound level between 65 dB and 75 dB. As an example of the sensitivity, a 1 dB increase in background sound level from 70 dB to 71 dB yields a 14 percent decrease in sentence intelligibility. The sensitivity of speech interference to noise at 65 dB and above is consistent with the criterion of DNL 65 dB generally taken from the Schultz curve. This is consistent with the observation that speech interference is the primary cause of annoyance.

Classroom Criteria. The effect of aircraft noise on children is a controversial area. Certain studies indicate that, in certain situations, children are potentially more sensitive to noise compared to adults. For example, adults average roughly 10 percent better than young children on speech intelligibility tests in high noise environments (ASA 2000). Some studies indicate that noise negatively impacts classroom learning (e.g., Shield and Dockrell 2008).

In response to noise-specific and other environmental studies, Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997), requires Federal agencies to ensure that their policies, programs, and activities address environmental health and safety risks and to identify any disproportionate risks to children. While the issue of noise impacts on children's learning is not fully settled, in May 2009, the American National Standards Institute (ANSI) published a classroom acoustics standard entitled "Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools" (ANSI 2002). At present, complying with the standard is voluntary in most locations. Essentially, the criteria states that when the noisiest hour is dominated by noise from such sources as aircraft, the limits for most classrooms are an hourly average A-weighted sound level of 40 dB, and the A-weighted sound level must not exceed 40 dB for more than 10 percent of the hour. For schools located near airfields, indoor noise levels would have to be lowered by 35–45 dBA relative to outdoor levels (ANSI 2009).

B.2.4 Sleep Disturbance

Sleep disturbance is another source of annoyance associated with aircraft noise. This is especially true because of the intermittent nature and content of aircraft noise, which is more disturbing than continuous noise of equal energy and neutral meaning.

Sleep disturbance may be measured in either of two ways. "Arousal" represents actual awakening from sleep, while a change in "sleep stage" represents a shift from one of four sleep stages to another stage of lighter sleep without actual awakening. In general, arousal requires a somewhat higher noise level than does a change in sleep stage.

An analysis sponsored by the Air Force summarized 21 published studies concerning the effects of noise on sleep (Pearsons et al. 1989). The analysis concluded that a lack of reliable in-home studies, combined with large differences among the results from the various laboratory studies, did not permit development of an acceptably accurate assessment procedure. The noise events used in the laboratory studies and in contrived in-home studies were presented at much higher rates of occurrence than would normally be experienced. None of the laboratory studies were of sufficiently long duration to determine any effects of habituation, such as that which would occur under normal community conditions. An extensive study of sleep interference in people's own homes (Ollerhead et al. 1992) showed very little disturbance from aircraft noise.

There is some controversy associated with these studies, so a conservative approach should be taken in judging sleep interference. Based on older data, the EPA identified an indoor DNL of 45 dB as necessary to protect against sleep interference (EPA 1974). Assuming an outdoor-to-indoor noise level reduction of 20 dB for typical dwelling units, this corresponds to an outdoor DNL of 65 dB as minimizing sleep interference.

A 1984 publication reviewed the probability of arousal or behavioral awakening in terms of SEL (Kryter 1984). Figure B–4, extracted from Figure 10.37 of Kryter (1984), indicates that an indoor SEL of 65 dB or lower should awaken less than 5 percent of those exposed. These results do not include any habituation over time by sleeping subjects. Nevertheless, this provides a reasonable guideline for assessing sleep interference and corresponds to similar guidance for speech interference, as noted above.

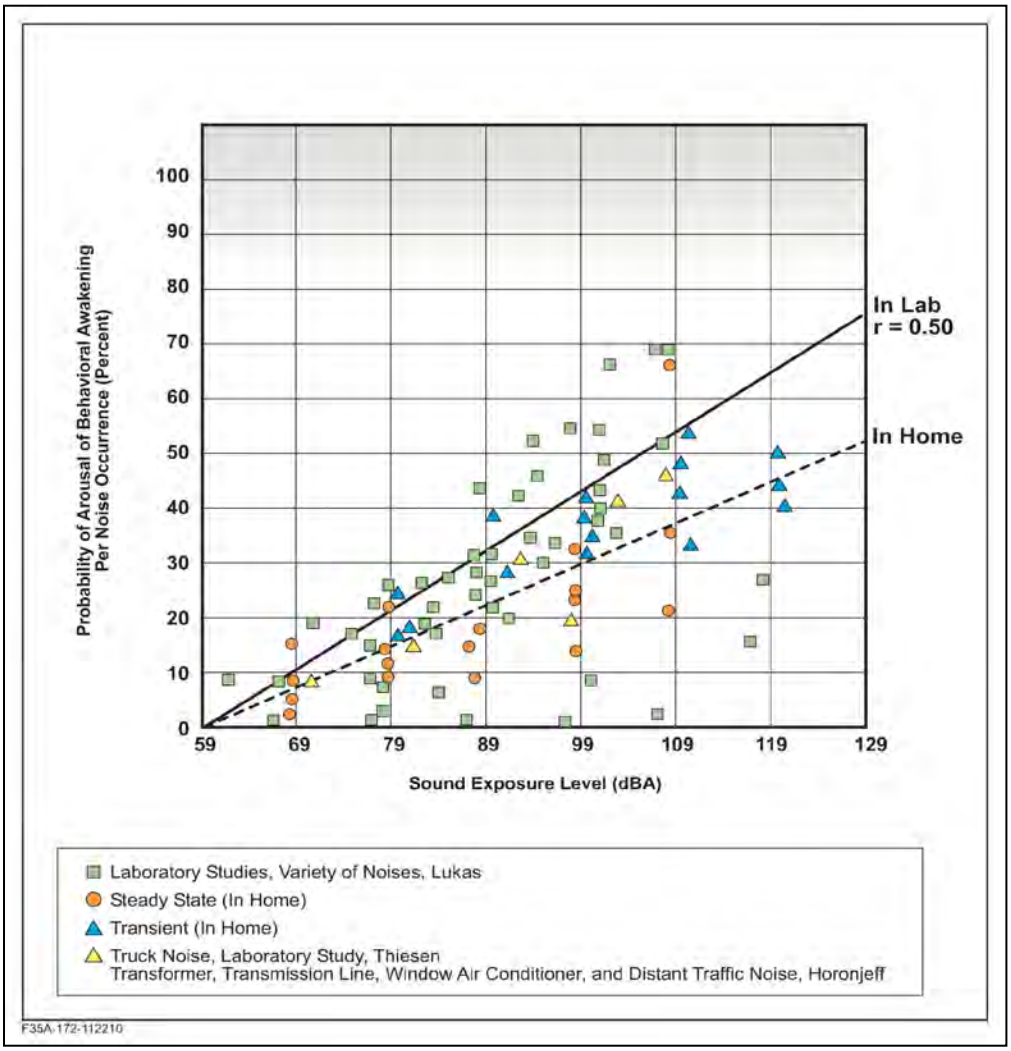


Figure B–4. Plot of Sleep Awakening Data versus Indoor SEL

It was noted in the early sleep disturbance research that the controlled laboratory studies did not account for many factors that are important to sleep behavior, such as habituation to the environment and previous exposure to noise and awakenings from sources other than aircraft noise. In the early 1990s, field studies were conducted to validate the earlier laboratory work. The most significant finding from these studies was that an estimated 80 to 90 percent of sleep disturbances were not related to individual outdoor noise events, but were instead the result of indoor noise sources and other non-noise-related factors. The results showed that there was less of an effect of noise on sleep in real-life conditions than had been previously reported from laboratory studies.

The interim Federal Interagency Committee on Noise (FICON) dose-response curve that was recommended for use in 1992 was based on the most pertinent sleep disturbance research that was conducted through the 1970s, primarily in laboratory settings. After that time, considerable field research was conducted to evaluate the sleep effects in peoples' normal, home environment. Laboratory sleep studies tend to show higher values of sleep disturbance than field studies because people who sleep in their own homes are habituated to their environment and, therefore, do not wake up as easily (FICAN 1997).

Based on the new information, the Federal Interagency Committee on Aircraft Noise (FICAN) updated its recommended dose-response curve in 1997, depicted as the lower curve in Figure B–5. This figure is based on the results of three field studies (Ollerhead et al. 1992; Fidell et al. 1994; Fidell et al. 1995a and 1995b), along with the datasets from six previous field studies.

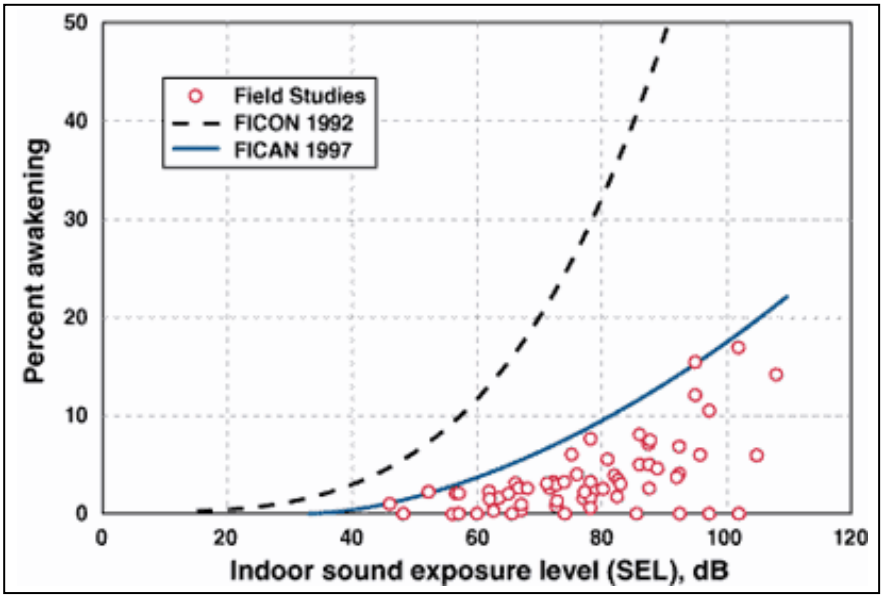


Figure B–5. FICAN's 1997 Recommended Sleep Disturbance Dose-Response Relationship

The new relationship represents the higher end, or upper envelope, of the latest field data. It should be interpreted as predicting the "maximum percent of the exposed population expected to be behaviorally awakened" or the "maximum percent awakened" for a given residential population. According to this relationship, a maximum of 3 percent of people would be awakened at an indoor SEL of 58 dB, compared to 10 percent using the 1992 curve. An indoor SEL of 58 dB is equivalent to outdoor SEL's of 73 and 83 dB respectively assuming 15 and 25 dB noise level reduction from outdoor to indoor with windows open and closed, respectively.

The FICAN 1997 curve is represented by the following equation:

$$\textbf{Percent Awakenings} = 0.0087 \times [\text{SEL} - 30]^{1.79}$$

Note the relatively low percentage of awakenings to fairly high noise levels. People think they are awakened by a noise event, but usually the reason for awakening is otherwise. For

example, the 1992 UK CAA study found the average person was awakened about 18 times per night for reasons other than exposure to an aircraft noise – some of these awakenings are due to the biological rhythms of sleep and some to other reasons that were not correlated with specific aircraft events.

In July 2008 ANSI and the Acoustical Society of America (ASA) published a method to estimate the percent of the exposed population that might be awakened by multiple aircraft noise events based on statistical assumptions about the probability of awakening (or not awakening) (ANSI 2008). This method relies on probability theory rather than direct field research/experimental data to account for multiple events.

Figure B–6 depicts the awakenings data that form the basis and equations of ANSI (2008). The curve labeled 'Eq. (B1)' is the relationship between noise and awakening endorsed by FICAN in 1997. The ANSI recommended curve labeled 'Eq. 1)' quantifies the probability of awakening for a population of sleepers who are exposed to an outdoor noise event as a function of the associated indoor SEL in the bedroom. This curve was derived from studies of behavioral awakenings associated with noise events in "steady state" situations where the population has been exposed to the noise long enough to be habituated. The data points in Figure B–6 come from these studies. Unlike the FICAN curve, the ANSI 2008 curve represents the average of the field research data points.

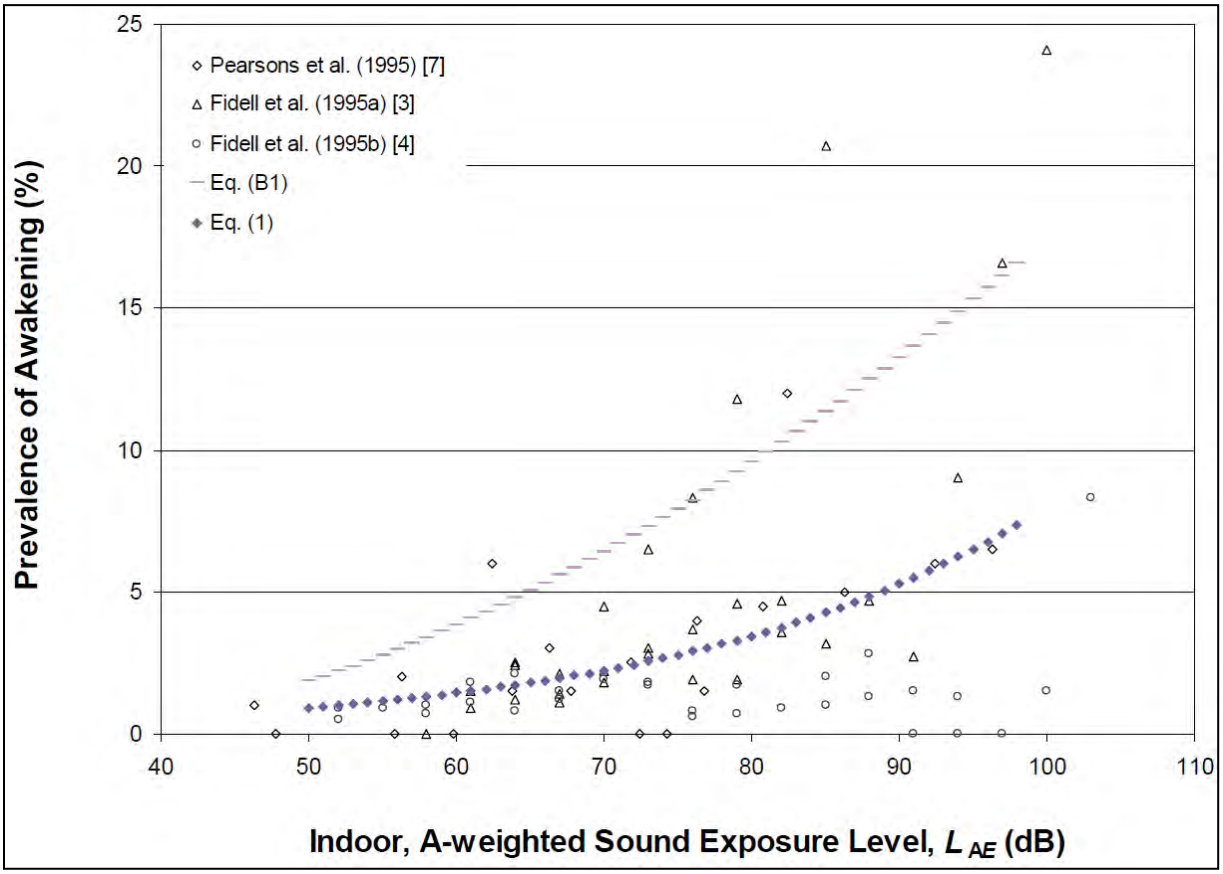


Figure B–6. Relation Between Indoor SEL and Percentage of Persons Awakened as Stated in ANSI/ASA S12.9-2008/Part 6

In December 2008, FICAN recommended the use of this new estimation procedure for future analyses of behavioral awakenings from aircraft noise. In that statement, FICAN also recognized that additional sleep disturbance research is underway by various research organizations, and results of that work may result in additional changes to FICAN's position. Until that time, FICAN recommends the use of ANSI (2008).

B.2.5 Noise-Induced Hearing Impairment

Residents in surrounding communities express concerns regarding the effects of aircraft noise on hearing. This section provides a brief overview of hearing loss caused by noise exposure. The goal is to provide a sense of perspective as to how aircraft noise (as experienced on the ground) compares to other activities that are often linked with hearing loss.

Hearing loss is generally interpreted as a decrease in the ear's sensitivity or acuity to perceive sound; i.e., a shift in the hearing threshold to a higher level. This change can either be a Temporary Threshold Shift (TTS), or a Permanent Threshold Shift (PTS) (Berger et al. 1995). TTS can result from exposure to loud noise over a given amount of time, yet the hearing loss is not necessarily permanent. An example of TTS might be a person attending a loud music concert. After the concert is over, the person may experience a threshold shift that may last several hours, depending upon the level and duration of exposure. While experiencing TTS, the person becomes less sensitive to low-level sounds, particularly at certain frequencies in the speech range (typically near 4,000 Hz). Normal hearing ability eventually returns, as long as the person has enough time to recover within a relatively quiet environment.

PTS usually results from repeated exposure to high noise levels, where the ears are not given adequate time to recover from the strain and fatigue of exposure. A common example of PTS is the result of working in a loud environment such as a factory. It is important to note that a temporary shift (TTS) can eventually become permanent (PTS) over time with continuous exposure to high noise levels. Thus, even if the ear is given time to recover from TTS, repeated occurrence of TTS may eventually lead to permanent hearing loss. The point at which a TTS results in a PTS is difficult to identify and varies with a person's sensitivity.

Considerable data on hearing loss have been collected and analyzed by the scientific/medical community. It has been well established that continuous exposure to high noise levels will damage human hearing (EPA 1978). The Occupational Safety and Health Administration (OSHA) regulation of 1971 standardizes the limits on workplace noise exposure for protection from hearing loss as an average level of 90 dB over an 8-hour work period or 85 dB over a 16-hour period (the average level is based on a 5 dB decrease per doubling of exposure time) (DoL 1971). Even the most protective criterion (no measurable hearing loss for the most sensitive portion of the population at the ear's most sensitive frequency, 4,000 Hz, after a 40-year exposure) is an average sound level of 70 dB over a 24-hour period.

The EPA established 75 dB for an 8-hour exposure and 70 dB for a 24-hour exposure as the average noise level standard requisite to protect 96 percent of the population from greater than a 5 dB PTS (EPA 1978). The National Academy of Sciences Committee on Hearing, Bioacoustics, and Biomechanics identified 75 dB as the minimum level at which hearing loss may occur (CHABA 1977). Finally, the World Health Organization (WHO) has concluded that environmental and leisure-time noise below an $L_{eq}24$ value of 70 dB "will not cause hearing loss in the large majority of the population, even after a lifetime of exposure" (WHO 2000).

B.2.5.1 Hearing Loss and Aircraft Noise

The 1982 EPA Guidelines report specifically addresses the criteria and procedures for assessing the noise-induced hearing loss in terms of the Noise-Induced Permanent Threshold Shift (NIPTS), a quantity that defines the permanent change in hearing level, or threshold, caused by exposure to noise (EPA 1982). This effect is also described as Potential Hearing Loss (PHL). Numerically, the NIPTS is the change in threshold averaged over the frequencies 0.5, 1, 2, and 4 kHz that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with the exposure beginning at an age of 20 years. A grand average of the NIPTS over time (40 years) and hearing sensitivity (10 to 90 percentiles of the exposed population) is termed the Average NIPTS, or Ave NIPTS for short. The Average Noise Induced Permanent Threshold Shift (Ave. NIPTS) that can be expected for noise exposure as measured by the DNL metric is given in Table B–5.

Table B–5. Average NIPTS and 10th Percentile NIPTS as a Function of DNL

DNL	*Ave. NIPTS dB**	*10^{th} Percentile NIPTS dB**
75–76	1.0	4.0
76–77	1.0	4.5
77–78	1.6	5.0
78–79	2.0	5.5
79–80	2.5	6.0
80–81	3.0	7.0
81–82	3.5	8.0
82–83	4.0	9.0
83–84	4.5	10.0
84–85	5.5	11.0
85–86	6.0	12.0
86–87	7.0	13.5
87–88	7.5	15.0
88–89	8.5	16.5
89–90	9.5	18.0

Note: *Rounded to the nearest 0.5 dB.

For example, for a noise exposure of 80 dB DNL, the expected lifetime average value of NIPTS is 2.5 dB, or 6.0 dB for the 10th percentile. Characterizing the noise exposure in terms of DNL will usually overestimate the assessment of hearing loss risk as DNL includes a 10 dB weighting factor for aircraft operations occurring between 10 p.m. and 7 a.m. If, however, flight operations between the hours of 10 p.m. and 7 a.m. account for 5 percent or less of the total 24-hour operations, the overestimation is on the order of 1.5 dB.

From a civilian airport perspective, the scientific community has concluded that there is little likelihood that the resulting noise exposure from aircraft noise could result in either a temporary or permanent hearing loss. Studies on community hearing loss from exposure to aircraft flyovers near airports showed that there is no danger, under normal circumstances, of hearing loss due to aircraft noise (Newman and Beattie 1985). The EPA criterion ($L_{eq}24$ = 70 dBA) can be exceeded in some areas located near airports, but that is only the case outdoors. Inside a building, where people are more likely to spend most of their time, the

average noise level will be much less than 70 dBA (Eldred and von Gierke 1993). Eldred and von Gierke also report that "several studies in the U.S., Japan, and the U.K. have confirmed the predictions that the possibility for permanent hearing loss in communities, even under the most intense commercial take-off and landing patterns, is remote."

With regard to military airbases, as individual aircraft noise levels are increasing with the introduction of new aircraft, a 2009 DoD policy directive requires that hearing loss risk be estimated for the at risk population, defined as the population exposed to DNL greater than or equal to 80 dB and higher (DoD 2009). Specifically, DoD components are directed to "*use the 80 Day-Night A-Weighted (DNL) noise contour to identify populations at the most risk of potential hearing loss.*" This does not preclude populations outside the 80 DNL contour, i.e., at lower exposure levels, from being at some degree of risk of hearing loss. However, the analysis should be restricted to populations within this contour area, including residents of on-base housing. The exposure of workers inside the base boundary area should be considered occupational and evaluated using the appropriate DoD component regulations for occupational noise exposure.

With regard to military airspace activity, studies have shown conflicting results. A 1995 laboratory study measured changes in human hearing from noise representative of low-flying aircraft on Military Training Routes (MTRs) (West and Green 1994). The potential effects of aircraft flying along MTRs is of particular concern because of maximum overflight noise levels can exceed 115 dB, with rapid increases in noise levels exceeding 30 dB per second. In this study, participants were first subjected to four overflight noise exposures at A-weighted levels of 115 dB to 130 dB. Fifty percent of the subjects showed no change in hearing levels, 25 percent had a temporary 5 dB *increase* in sensitivity (the people could hear a 5 dB wider range of sound than before exposure), and 25 percent had a temporary 5 dB decrease in sensitivity (the people could hear a 5 dB narrower range of sound than before exposure). In the next phase, participants were subjected to a single overflight at a maximum level of 130 dB for eight successive exposures, separated by 90 seconds or until a temporary shift in hearing was observed. The temporary hearing threshold shifts showed an increase in sensitivity of up to 10 dB.

In another study of 115 test subjects between 18 and 50 years old in 1999, temporary threshold shifts were measured after laboratory exposure to military low-altitude flight noise (Ising et al. 1999). According to the authors, the results indicate that repeated exposure to military low-altitude flight noise with L_{max} greater than 114 dB, especially if the noise level increases rapidly, may have the potential to cause noise induced hearing loss in humans.

Aviation and typical community noise levels near airports are not comparable to the occupational or recreational noise exposures associated with hearing loss. Studies of aircraft noise levels associated with civilian airport activity have not definitively correlated permanent hearing impairment with aircraft activity. It is unlikely that airport neighbors will remain outside their homes 24 hours per day, so there is little likelihood of hearing loss below an average sound level of 75 dB DNL. Near military airbases, average noise levels above 75 dB may occur, and while new DoD policy dictates that NIPTS be evaluated, no research results to date have definitively related permanent hearing impairment to aviation noise.

B.2.5.2 Non-auditory Health Effects

Studies have been conducted to determine whether correlations exist between noise exposure and cardiovascular problems, birth weight, and mortality rates. The non-auditory effect of noise on humans is not as easily substantiated as the effect on hearing. Prolonged stress is known to be a contributor to a number of health disorders. Kryter and Poza (1980) state, "It is more likely that noise-related general ill-health effects are due to the psychological annoyance from the noise interfering with normal everyday behavior, than it is from the noise eliciting, because of its intensity, reflexive response in the autonomic or other physiological systems of the body." Psychological stresses may cause a physiological stress reaction that could result in impaired health. The National Institute for Occupational Safety and Health (NIOSH) and EPA commissioned the Committee on Hearing, Bioacoustics and Biomechanics (CHABA) in 1981 to study whether established noise standards are adequate to protect against health disorders other than hearing defects. CHABA's conclusion was that:

> Evidence from available research reports is suggestive, but it does not provide definitive answers to the question of health effects, other than to the auditory system, of long-term exposure to noise. It seems prudent, therefore, in the absence of adequate knowledge as to whether or not noise can produce effects upon health other than damage to auditory system, either directly or mediated through stress, that insofar as feasible, an attempt should be made to obtain more critical evidence.

Since the CHABA report, there have been further studies that suggest that noise exposure may cause hypertension and other stress-related effects in adults. Near an airport in Stockholm, Sweden, the prevalence of hypertension was reportedly greater among nearby residents who were exposed to energy averaged noise levels exceeding 55 dB and maximum noise levels exceeding 72 dB, particularly older subjects and those not reporting impaired hearing ability (Rosenlund et al. 2001). A study of elderly volunteers who were exposed to simulated military low-altitude flight noise reported that blood pressure was raised by L_{max} of 112 dB and high speed level increase (Michalak et al. 1990). Yet another study of subjects exposed to varying levels of military aircraft or road noise found no significant relationship between noise level and blood pressure (Pulles et al. 1990).

Most studies of non-auditory health effects of long-term noise exposure have found that noise exposure levels established for hearing protection will also protect against any potential non-auditory health effects, at least in workplace conditions. One of the best scientific summaries of these findings is contained in the lead paper at the National Institutes of Health Conference on Noise and Hearing Loss, held on 22 to 24 January 1990 in Washington, DC:

> The nonauditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardiovascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an 8-hour day).

At the 1988 International Congress on Noise as a Public Health Problem, most studies attempting to clarify such health effects did not find them at levels below the criteria protective of noise-induced hearing loss, and even above these criteria, results regarding such health effects were ambiguous. Consequently, one comes to the conclusion that establishing and enforcing exposure levels protecting against noise-induced hearing loss would not only solve the noise-induced hearing loss problem, but also any potential non-auditory health effects in the work place (von Gierke 1990).

Although these findings were specifically directed at noise effects in the workplace, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the non-auditory health effects of aircraft noise are ambiguous, at best, and often contradictory. Yet, even those studies that purport to find such health effects use time-average noise levels of 75 dB and higher for their research.

For example, two University of California, Los Angeles (UCLA) researchers apparently found a relationship between aircraft noise levels under the approach path to Los Angeles International Airport and increased mortality rates among the exposed residents by using an average noise exposure level greater than 75 dB for the "noise-exposed" population (Meacham and Shaw 1979). Nevertheless, three other UCLA professors analyzed those same data and found no relationship between noise exposure and mortality rates (Frerichs et al. 1980).

As a second example, two other UCLA researchers used this same population near Los Angeles International Airport to show a higher rate of birth defects for 1970 to 1972 when compared with a control group residing away from the airport (Jones and Tauscher 1978). Based on this report, a separate group at the Center for Disease Control performed a more thorough study of populations near Atlanta's Hartsfield International Airport for 1970 to 1972 and found no relationship in their study of 17 identified categories of birth defects to aircraft noise levels above 65 dB (Edmonds et al. 1979).

In summary, there is no scientific basis for a claim that potential health effects exist for aircraft time average sound levels below 75 dB. The potential for noise to affect physiological health, such as the cardiovascular system, has been speculated; however, no unequivocal evidence exists to support such claims (Harris 1997). Conclusions drawn from a review of health effect studies involving military low-altitude flight noise with its unusually high maximum levels and rapid rise in sound level have shown no increase in cardiovascular disease (Schwarze and Thompson 1993). Additional claims that are unsupported include flyover noise producing increased mortality rates and increases in cardiovascular death, increased stress, increases in admissions to mental hospitals, and adverse affects on pregnant women and the unborn fetus (Harris 1997).

B.2.5.3 Performance Effects

The effect of noise on the performance of activities or tasks has been the subject of many studies. Some of these studies have established links between continuous high noise levels and performance loss. Noise-induced performance losses are most frequently reported in studies employing noise levels in excess of 85 dB. Little change has been found in low-noise cases. It has been cited that moderate noise levels appear to act as a stressor for more sensitive

individuals performing a difficult psychomotor task. While the results of research on the general effect of periodic aircraft noise on performance have yet to yield definitive criteria, several general trends have been noted including:

- A periodic intermittent noise is more likely to disrupt performance than a steady-state continuous noise of the same level. Flyover noise, due to its intermittent nature, might be more likely to disrupt performance than a steady-state noise of equal level.
- Noise is more inclined to affect the quality than the quantity of work.
- Noise is more likely to impair the performance of tasks that place extreme demands on the worker.

B.2.5.4 Noise Effects on Children

In response to noise-specific and other environmental studies, Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (1997), requires Federal agencies to ensure that policies, programs, and activities address environmental health and safety risks to identify any disproportionate risks to children.

A review of the scientific literature indicates that there has not been a tremendous amount of research in the area of aircraft noise effects on children. The research reviewed does suggest that environments with sustained high background noise can have variable effects, including noise effects on learning and cognitive abilities, and reports of various noise-related physiological changes.

B.2.5.5 Effects on Learning and Cognitive Abilities

In 2002 ANSI refers to studies that suggest that loud and frequent background noise can affect the learning patterns of young children (ANSI 2002). ANSI provides discussion on the relationships between noise and learning, and stipulates design requirements and acoustical performance criteria for outdoor-to-indoor noise isolation. School design is directed to be cognizant of, and responsive to surrounding land uses and the shielding of outdoor noise from the indoor environment. The ANSI acoustical performance criteria for schools include the requirement that the 1-hour-average background noise level shall not exceed 35 dBA in core learning spaces smaller than 20,000 cubic-feet and 40 dBA in core learning spaces with enclosed volumes exceeding 20,000 cubic-feet. This would require schools be constructed such that, in quiet neighborhoods indoor noise levels are lowered by 15 to 20 dBA relative to outdoor levels. In schools near airports, indoor noise levels would have to be lowered by 35 to 45 dBA relative to outdoor levels (ANSI 2002).

The studies referenced by ANSI to support the new standard are not specific to jet aircraft noise and the potential effects on children. However, there are references to studies that have shown that children in noisier classrooms scored lower on a variety of tests. Excessive background noise or reverberation within schools causes interferences of communication and can therefore create an acoustical barrier to learning (ANSI 2002). Studies have been performed that contribute to the body of evidence emphasizing the importance of communication by way of the spoken language to the development of cognitive skills. The ability to read, write, comprehend, and maintain attentiveness, are, in part, based upon whether teacher communication is consistently intelligible (ANSI 2002).

Numerous studies have shown varying degrees of effects of noise on the reading comprehension, attentiveness, puzzle-solving, and memory/recall ability of children. It is generally accepted that young children are more susceptible than adults to the effects of background noise. Because of the developmental status of young children (linguistic, cognitive, and proficiency), barriers to hearing can cause interferences or disruptions in developmental evolution.

Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in the last 20 years. Several studies suggest that aircraft noise can affect the academic performance of schoolchildren. Although many factors could contribute to learning deficits in school-aged children (e.g., socioeconomic level, home environment, diet, sleep patterns), evidence exists that suggests that chronic exposure to high aircraft noise levels can impair learning. Specifically, elementary school children attending schools near New York City's two airports demonstrated lower reading scores than children living farther away from the flight paths (Green et al. 1982). Researchers have found that tasks involving central processing and language comprehension (such as reading, attention, problem solving, and memory) appear to be the most affected by noise (Evans and Lepore 1993, Evans et al. 1998). It has been demonstrated that chronic exposure of first- and second-grade children to aircraft noise can result in reading deficits and impaired speech perception (i.e., the ability to hear common, low-frequency [vowel] sounds but not high frequencies [consonants] in speech) (Evans and Maxwell 1997).

The Evans and Maxwell (1997) study found that chronic exposure to aircraft noise resulted in reading deficits and impaired speech perception for first- and second-grade children. Other studies found that children residing near the Los Angeles International Airport had more difficulty solving cognitive problems and did not perform as well as children from quieter schools in puzzle-solving and attentiveness (Bronzaft 1997, Cohen et al. 1980). Children attending elementary schools in high aircraft noise areas near London's Heathrow Airport demonstrated poorer reading comprehension and selective cognitive impairments (Haines et al. 2001a, 2001b). Similar studies involving the testing of attention, memory, and reading comprehension of school children located near airports showed that their tests exhibited reduced performance results compared to those of similar groups of children who were located in quieter environments (Evans et al. 1998, Haines et al. 1998). The Haines and Stansfeld study indicated that there may be some long-term effects associated with exposure, as one-year follow-up testing still demonstrated lowered scores for children in higher noise schools (Haines et al. 2001a, 2001b). In contrast, a 2002 study found that although children living near the old Munich airport scored lower in standardized reading and long-term memory tests than a control group, their performance on the same tests improved once the airport was closed (Hygge et al. 2002).

Finally, although it is recognized that there are many factors that could contribute to learning deficits in school-aged children, there is increasing awareness that chronic exposure to high aircraft noise levels may impair learning. This awareness has led the WHO and a North Atlantic Treaty Organization (NATO) working group to conclude that daycare centers and schools should not be located near major sources of noise, such as highways, airports, and industrial sites (WHO 2000, NATO 2000).

B.2.5.6 Health Effects

Physiological effects in children exposed to aircraft noise and the potential for health effects have also been the focus of limited investigation. Studies in the literature include examination of blood pressure levels, hormonal secretions, and hearing loss.

As a measure of stress response to aircraft noise, authors have looked at blood pressure readings to monitor children's health. Children who were chronically exposed to aircraft noise from a new airport near Munich, Germany, had modest (although significant) increases in blood pressure, significant increases in stress hormones, and a decline in quality of life (Evans et al. 1998). Children attending noisy schools had statistically significant average systolic and diastolic blood pressure ($p<0.03$). Systolic blood pressure means were 89.68 mm for children attending schools located in noisier environments compared to 86.77 mm for a control group. Similarly, diastolic blood pressure means for the noisier environment group were 47.84 mm and 45.16 for the control group (Cohen et al. 1980).

Although the literature appears limited, studies focused on the wide range of potential effects of aircraft noise on school children have also investigated hormonal levels between groups of children exposed to aircraft noise compared to those in a control group. Specifically, two studies analyzed cortisol and urinary catecholamine levels in school children as measurements of stress response to aircraft noise (Haines et al. 2001b, 2001c). In both instances, there were no differences between the aircraft-noise-exposed children and the control groups.

Other studies have reported hearing losses from exposure to aircraft noise. Noise-induced hearing loss was reportedly higher in children who attended a school located under a flight path near a Taiwan airport, as compared to children at another school far away (Chen et al. 1997). Another study reported that hearing ability was reduced significantly in individuals who lived near an airport and were frequently exposed to aircraft noise (Chen and Chen 1993). In that study, noise exposure near the airport was reportedly uniform, with DNL greater than 75 dB and maximum noise levels of about 87 dB during overflights. Conversely, several other studies that were reviewed reported no difference in hearing ability between children exposed to high levels of airport noise and children located in quieter areas (Fisch 1977, Andrus et al. 1975, Wu et al. 1995).

B.2.6 Noise Effects on Domestic Animals and Wildlife

Hearing is critical to an animal's ability to react, compete, reproduce, hunt, forage, and survive in its environment. While the existing literature does include studies on possible effects of jet aircraft noise and sonic booms on wildlife, there appears to have been little concerted effort in developing quantitative comparisons of aircraft noise effects on normal auditory characteristics. Behavioral effects have been relatively well described, but the larger ecological context issues, and the potential for drawing conclusions regarding effects on populations, has not been well developed.

The following discussion provides an overview of the existing literature on noise effects (particularly jet aircraft noise) on animal species. The literature reviewed outlines those studies that have focused on the observations of the behavioral and in some cases physiological responses of animals to jet aircraft overflight and sonic booms.

The abilities to hear sounds and noise and to communicate assist wildlife in maintaining group cohesiveness and survivorship. Social species communicate by transmitting calls of warning, introduction, and others that are subsequently related to an individual's or group's responsiveness. Animal species differ greatly in their responses to noise. Noise effects on domestic animals and wildlife are classified as primary, secondary, and tertiary. Primary effects are direct, physiological changes to the auditory system, and most likely include the masking of auditory signals. Masking is defined as the inability of an individual to hear important environmental signals that may arise from mates, predators, or prey. There is some potential that noise could disrupt a species' ability to communicate or interfere with behavioral patterns (Manci et al. 1988; Warren et al. 2006), however this would be a greater concern for continuous or near-continuous noise sources (e.g., compressors, near busy highway) than for intermittent brief exposures such as military jet overflight. Increased noise levels reduce the distance and area over which acoustic signals can be perceived by animals (Barber et al. 2009). Although the effects are likely temporary, aircraft noise may cause masking of auditory signals within exposed faunal communities. Animals rely on hearing to avoid predators, obtain food, and communicate and attract other members of their species. Aircraft noise may mask or interfere with these functions. Other primary effects, such as eardrum rupture or temporary and permanent hearing threshold shifts, are unlikely given the noise levels produced by aircraft overflights. Secondary effects may include non-auditory effects such as stress and hypertension; behavioral modifications; interference with mating or reproduction; and impaired ability to obtain adequate food, cover, or water. Tertiary effects are the direct result of primary and secondary effects. These include population decline and habitat loss. Most of the effects of noise are mild enough to be undetectable as variables of change in population size or population growth against the background of normal variation (Bowles 1995). Other environmental variables (e.g., predators, weather, changing prey base, ground-based disturbance) also influence secondary and tertiary effects and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region (Gladwin et al. 1988). Overall, the literature suggests that species differ in their response to various types, durations, and sources of noise (Manci et al. 1988; Radle 2007; NPS 2011) and that response of unconfined wildlife and domestic animals to aircraft overflight under most circumstances has minimal biological significance.

Considerable research has been conducted on the effects of aircraft noise on the public and the potential for adverse ecological impacts. These studies were largely completed in response to the increase in air travel and the introduction of supersonic commercial jet aircraft (e.g., the Concorde). According to Manci et al. (1988), the foundation of information created from that focus did not necessarily correlate or provide information specific to the impacts to wildlife in areas overflown by aircraft at supersonic speed or at low altitudes. A 1997 review revealed that aircraft noise plays a minor role in disturbance to animals when separated from the optical stimuli and uses examples of nearly soundless paragliders causing panic flights (Kempf and Hüppop 1997). This research indicated that sonic booms and jet aircraft noise can cause startle responses, but do not result in severe consequences and severity of response depends upon previous exposure. These authors felt that aside from the rare panic flights causing accidents, negative consequences of aircraft noise *per se* on individuals and populations are not proven (Kempf and Hüppop 1997). Similarly, the Air Force has conducted many studies and defines a startle or startle response as the sequence of events that occurs when an animal is surprised, including behavioral responses (muscular flinching, alerting and running) and physiological

changes (e.g., elevated heart rate and other physiologic changes) (Air Force 1994). The startle is a natural response that helped the ancestors of domestic stock avoid predators. If the behavioral component of the startle is uncontrolled, particularly if the animal runs or jumps without concern for its safety, it is often called a panic. Completely uncontrolled panics are rare in mammals (Air Force 1994).

Pepper et al. (2003) suggest that many past studies were inconclusive and based on relatively small sample sizes and that more work is needed to determine if noise adversely impacts wildlife. Research into the effects of noise on wildlife often presents conflicting results because of the variety of factors and variables that can affect and/or interfere with the determination of the actual effects that human-produced noise is having on any given animal (Radle 2007).

Many scientific studies have investigated the effects of aircraft noise on wildlife, and some have focused on wildlife "flight" due to noise. Apparently, animal responses to aircraft are influenced by many variables, including size, speed, proximity (both height above the ground and lateral distance), engine noise, color, flight profile, and radiated noise. The type of aircraft (e.g., fixed wing versus rotary-wing [helicopter]) and type of flight mission may also produce different levels of disturbance, with varying animal responses (Gladwin et al. 1988). Consequently, it is difficult to generalize animal responses to noise disturbances across species.

Periodic literature reviews have concluded that, while behavioral observation studies were relatively limited a general behavioral reaction in animals from exposure to aircraft noise/overflight ranges from performing a visual scan to altering to a startle response (Manci et al. 1988; Bowles 1995; NPS 2011). The intensity and duration of the startle response appears to be dependent on which species is exposed, whether there is a group or an individual, and whether there have been previous exposures. Responses range from movement of the head in the apparent direction of the noise source, to alerting, and in rare cases to flight, trampling, stampeding, jumping, or running. Manci et al. (1988) reported that the literature indicated that avian species might be more sensitive to aircraft noise than mammals. In addition to flight, other concerns with regard to impact from noise disturbance on wildlife or livestock include the following possible responses and effects:

- Possible injury due to trampling or uncontrolled running or flight
- Increased expenditure of energy, particularly during critical periods (e.g., breeding, winter)
- Decreased time spent on life functions (e.g., seeking food or mates)
- Temporary masking of auditory signals from other animals of the same species, predators, or prey (e.g., noise could prevent an animal from hearing the approach of a predator)
- Damage to eggs or nestlings if a bird is startled from its nest
- Temporary exposure of eggs or young in nest to environmental conditions or predation if a parent flees
- Temporary increased risk of predation if startled animals flee from nests, roosts, or other protective cover

Although the above-listed concerns have been raised in the literature and examples have been documented, studies of unconfined wildlife and domestic animals to overflight by military jet aircraft at 500 feet above ground level (AGL) or higher have not shown measurable changes in population size or reproductive success at the population level or other significant biological impact under normal conditions.

B.2.6.1 Domestic Animals

Although some studies report that the effects of aircraft noise on domestic animals is inconclusive, a majority of the literature reviewed indicates that domestic animals exhibit some behavioral responses to military overflights, but generally seem to habituate to the disturbances over a period of time. Mammals in particular appear to react to noise at sound levels higher than 90 dB, with responses including a startle response, alerting, freezing (i.e., becoming temporarily stationary), and fleeing from the sound source. Because large, domestic animals normally control their movements even when frightened, and because they habituate quickly to aircraft noise (even to the noise of low-altitude, high-speed aircraft overflights), panic-related responses are rare. They are most common in horses and least common in dairy cattle, which are exposed to frequent human disturbance and are bred for docility. Some studies have reported primary and secondary effects including reduced milk production and rate of milk release, increased glucose concentrations, decreased levels of hemoglobin, increased heart rate, and a reduction in thyroid activity. These latter effects appear to represent a small percentage of the findings occurring in the existing literature.

Some reviewers have indicated that earlier studies and claims by farmers linking adverse effects of aircraft noise on livestock did not necessarily provide clear-cut evidence of cause and effect (Cottereau 1978). Many studies conclude that there is no evidence that aircraft overflights affect feed intake, growth, or production rates in domestic animals (Air Force 1994).

Cattle. In response to concerns about overflight effects on pregnant cattle, milk production, and cattle safety, the U.S. Air Force prepared a handbook for environmental protection that summarizes the literature on the impacts of low-altitude flights on livestock (and poultry), and includes specific case studies conducted in numerous airspaces across the country. Adverse effects were found in a few studies, but have not been reproduced in other similar studies. One such study, conducted in 1983, suggested that 2 of 10 cows in late pregnancy aborted after showing rising estrogen and falling progesterone levels. These increased hormonal levels were reported as being linked to 59 aircraft overflights. The remaining eight cows showed no changes in their blood concentrations and calved normally (Air Force 1994). A similar study reported that abortions occurred in three out of five pregnant cattle after exposing them to flyovers by six different aircraft (Air Force 1994). Another study suggested that feedlot cattle could stampede and injure themselves when exposed to low-level overflights (Air Force 1994).

A majority of the studies reviewed suggest that there is little or no effect of aircraft noise on cattle. Studies presenting adverse effects on domestic animals have been limited. A number of studies (Parker and Bayley 1960; Head 1992; Head et al. 1993) investigated the effects of jet aircraft noise and sonic booms on the milk production of dairy cows. Through the compilation and examination of milk production data from areas exposed to jet aircraft noise and sonic

boom events, it was determined that milk yields were not affected. This was particularly evident in cows that had been previously exposed to jet aircraft noise.

One study examined the causes of 1,763 abortions in Wisconsin dairy cattle over a one-year time period, and none were associated with aircraft disturbances (Air Force 1993). In 1987, Anderson contacted seven livestock operators for production data, and no effects of low-altitude and supersonic flights were noted. Three out of 43 cattle previously exposed to low-altitude flights showed a startle response to an F/A-18 aircraft flying overhead at 500 feet AGL at 400 knots by running less than 10 meters. They resumed normal activity within one minute (Air Force 1994). In 1983, Beyer found that helicopters caused more reaction than other low-aircraft overflights (Air Force 1994). A 1964 study also found that helicopters flying 30 to 60 feet overhead did not affect milk production and pregnancies of 44 cows and heifers (Air Force 1994).

Additionally, Beyer reported that five pregnant dairy cows in a pasture did not exhibit fright-flight tendencies or have their pregnancies disrupted after being overflown by 79 low-altitude helicopter flights and 4 low-altitude, subsonic jet aircraft flights (Air Force 1994). A 1956 study found that the reactions of dairy and beef cattle to noise from low-altitude, subsonic aircraft were similar to those caused by paper blowing about, strange persons, or other moving objects (Air Force 1994).

In a report to Congress, the U. S. Forest Service concluded that "evidence both from field studies of wild ungulates and laboratory studies of domestic stock indicate that the risks of damage are small (from aircraft approaches of 50 to 100 meters), as animals take care not to damage themselves (USFS 1992). If animals are overflown by aircraft at altitudes of 50 to 100 meters, there is no evidence that mothers and young are separated, that animals collide with obstructions (unless confined) or that they traverse dangerous ground at too high a rate." These varied study results suggest that, although the confining of cattle could magnify animal response to aircraft overflight, there is no proven cause-and-effect link between startling cattle from aircraft overflights and abortion rates or lower milk production.

Horses. Horses have also been observed to react to overflights of jet aircraft. Several of the studies reviewed reported a varied response of horses to low-altitude aircraft overflights. Observations made in 1966 and 1968 noted that horses galloped in response to jet flyovers (Air Force 1993). Strong reactions were observed, but no injuries sustained, when pregnant horses were exposed to very low-altitude aircraft overflights (50 meters or lower, most flights with sound levels over 95 dBA) and helicopters hovering 20 meters overhead (Air Force 1994). Although horses were observed noticing the overflights, it did not appear to affect either survivability or reproductive success.

LeBlanc et al. (1991) studied the effects of simulated aircraft noise over 100 dBA and visual stimuli on pregnant mares shortly before parturition. They specifically focused on any changes in pregnancy success, behavior, cardiac function, hormonal production, and rate of habituation. Their findings reported observations of "flight-fright" reactions, which caused increases in heart rates and serum cortisol concentrations. Levels of anxiety and mass body movements were the highest after initial exposure, but no horses injured themselves or their fetuses. Intensities of responses decreased with continued exposures, indicating habituation. There were no differences in pregnancy success when compared to a control group. Interestingly, the mares in

LeBlanc's study exposed to overflight noise only habituated much more rapidly than mares exposed to the visual stimulus from an overflight as well.

Swine. Generally, the literature findings for swine appear to be similar to those reported for cows and horses. While there are some effects from aircraft noise reported in the literature, these effects are minor. Studies of continuous noise exposure (i.e., 6 hours or 72 hours of constant exposure) reported influences on short-term hormonal production and release. Additional constant exposure studies indicated the observation of stress reactions, hypertension, and electrolyte imbalances (Dufour 1980). A study by Bond et al. (1963) demonstrated no adverse effects on the feeding efficiency, weight gain, ear physiology, or thyroid and adrenal gland condition of pigs subjected to aircraft noise. Observations of heart rate increase were recorded and it was noted that cessation of the noise resulted in the return to normal heart rates. Conception rates and offspring survivorship did not appear to be influenced by exposure to aircraft noise.

Similarly, long-term exposure of pigs to recorded aircraft noise at levels of 100 dB to 135 dB from weaning to slaughter had only minor effects on the rate of feed utilization, weight gain, food intake, and reproduction rates, and there were no injuries or inner ear changes observed (Manci et al. 1988; Gladwin et al. 1988).

Domestic Fowl. Effects of low-altitude overflights (below 1,000 feet) had negligible effects on domestic fowl (Air Force 1994). The paper did recognize that given certain circumstances, adverse effects could be serious. Some of the effects can be panic reactions, reduced productivity, and effects on marketability (e.g., bruising of the meat).

The typical reaction of domestic fowl after exposure to sudden, intense noise is a short-term startle response. The reaction ceases as soon as the stimulus is ended, and within a few minutes all activity returns to normal. More severe responses are possible depending on the number of birds, the frequency of exposure, and environmental conditions. Large crowds of confined birds and birds not previously exposed are more likely to pile up in response to a noise stimulus (Air Force 1994). According to studies and interviews with growers, it is typically the previously unexposed birds that incite panic crowding, and the tendency to do so is markedly reduced within five exposures to the stimulus (Air Force 1994). This suggests that the birds habituate relatively quickly. Egg productivity was not adversely affected by infrequent noise bursts, even at exposure levels as high as 120 to 130 dBA.

Between 1956 and 1988, there were 100 recorded claims against the Navy for alleged damage to domestic fowl. The number of claims averaged three per year, with peak numbers of claims following publications of studies on the topic in the early 1960s (Air Force 1994). Many of the claims were disproved or did not have sufficient supporting evidence. The claims were filed for the following alleged damages: 55 percent for panic reactions, 31 percent for decreased production, 6 percent for reduced hatchability, 6 percent for weight loss, and less than 1 percent for reduced fertility (Air Force 1994).

Turkeys. The review of the existing literature suggests that there has not been a concerted or widespread effort to study the effects of aircraft noise on commercial turkeys. One study involving turkeys examined the differences between simulated versus actual overflight aircraft

noise, turkey responses to the noise, weight gain, and evidence of habituation (Bowles et al. 1990). Findings from the study suggested that turkeys habituated to jet aircraft noise quickly, that there were no growth rate differences between the experimental and control groups, and that there were some behavioral differences that increased the difficulty in handling individuals within the experimental group.

Low-altitude overflights were shown to cause confined turkey flocks to occasionally pile up and experience high mortality rates due to the aircraft noise and a variety of disturbances unrelated to aircraft (Air Force 1994).

B.2.6.2 Wildlife

Studies on the effects of overflights and sonic booms on wildlife have been focused mostly on avian species and ungulates such as caribou and bighorn sheep. Few studies have been conducted on small terrestrial mammals, reptiles, amphibians, and carnivorous mammals. Chronic exposures are rarely relevant to wildlife because high levels and sustained levels of human-made noise are rare outside urban areas or industrial facilities (Bowles 1995). Guidelines that protect human hearing can reasonably be expected to also protect terrestrial wildlife because they are based on studies of laboratory animals. Susceptibility varies with species, but models currently in use are conservative (Bowles 1995). Generally, species that live entirely below the surface of the water have also been ignored due to the fact they do not experience the same level of sound as terrestrial species (NPS 1994).

B.2.6.3 Mammals

Terrestrial Mammals. Sound levels above about 90 dB may be detrimental to mammals and may be associated with a number of behaviors such as retreat from the sound source, freezing, or a strong startle response (Manci et al. 1988). Studies of terrestrial mammals have shown that noise levels of 120 dBA can damage mammals' ears, and levels of 95 dBA can cause adverse physiological changes (Manci et al. 1988).

It has been speculated that repeated aircraft overflight (e.g. surveillance flights along a pipeline) could affect large carnivores such as grizzly bears by causing changes in home ranges, foraging patterns, and breeding behavior (Dufour 1980). However, these possible effects have not been borne out in subsequent studies. Although wolves have been frightened by low-altitude flights that were 25 to 1,000 feet off the ground, wolves have been found to adapt to aircraft overflights and noise as long as they were not being hunted from aircraft (Dufour 1980). Incidental observations of wolves and bears exposed to fixed-wing aircraft and helicopters indicated a stronger reaction to helicopters, and that wolves were less disturbed by helicopters than wild ungulates, while individual grizzly bears showed the greatest response of any animal species observed (Manci et al. 1988) although response to overflight by grizzly bears varied from individual to individual Dufour (1980).

Wild ungulates (such as American bison, caribou, and bighorn sheep) appear to be much more sensitive to noise disturbance than domestic livestock (Manci et al. 1988; Weisenberger et al. 1996; Bleich et al. 1990, 1994). Behavioral reactions may be related to the past history of disturbances by such things as humans and aircraft. Behavioral reactions may be related to the past history of disturbances by such things as humans and aircraft. Behavioral

responses can range from mild to severe. Mild responses include head raising, body shifting, or turning to orient toward the aircraft. Moderate responses to disturbance may be nervous behaviors, such as trotting a short distance. Escape behavior would represent a typical severe response, but it is rarely observed in response to overflight above 500 feet AGL that does not include circling.

Common reactions of reindeer kept in an enclosure and exposed to aircraft noise disturbance included alerting postures, raising of the head, pricking ears, and scenting of the air. Panic reactions and extensive changes in behavior of individual animals were not observed. Observations of caribou in Alaska exposed to fixed-wing aircraft and helicopters showed running and panic reactions occurred when overflights were at an altitude of 200 feet or less. The reactions decreased with increased altitude of overflights, and for overflights higher than 500 feet in altitude, the panic reactions stopped. Also, smaller groups reacted less strongly than larger groups. One negative effect of running and avoidance behavior is increased expenditure of energy, which can usually be counteracted with increased feeding.

It has been shown that exposure to low-altitude overflights can result in increased heart rates, an indicator of excitement or stress, in pronghorn, mule deer, elk, and bighorn sheep. Weisenberger et al. (1996) measured the heart rate responses of captive bighorn sheep (*Ovis canadensis*) and mule deer (*Odocoileus hemionus*) to simulated aircraft noise ranging from 92 to 112 decibels (dB). For both species, heart rates increased following the simulated aircraft noise, but returned to normal levels within 60–180 seconds. Behavioral responses were relatively rare, and the animals returned to normal behavior within four to five minutes. Furthermore, the animals exhibited decreased responses to increased exposure, suggesting habituation. A study reported possible effects on bighorn sheep energetic reserves through changes in food intake when helicopters were within 500 meters of animals (Bowles 1995). Authors observed that bighorn sheep alerted more while eating in the presence of helicopters than when undisturbed. They concluded that frequent alerting affected food intake. Krausman et al. (1998) studied the response of bighorn sheep in a 790-acre enclosure to frequent F-16 overflights at 395 feet AGL. Heart rates increased above preflight level during 7 percent of the overflights but returned to normal within 120 seconds. No behavioral response by the bighorn sheep was observed during the overflights.

Studies on pronghorn (*Antilocapra americana*) response to overflight by jet aircraft and helicopters have suggested rapid habituation to overflight after initial responses, which include running for short distances (Workman et al. 1992; Bayless et al. 2004). In the Bayless et al. (2004) study, which included day and night exposures to nearby helicopter activity, there were fewer movements in response to overflight during nighttime hours than during daylight, suggesting a visual component to the reaction in addition to noise. Luz and Smith (1976) observed that pronghorn did not run until a helicopter was within 150 feet AGL. Krausman et al. (2004) found that endangered Sonoran pronghorn on the Barry M. Goldwater Range (BMGR) rarely responded to military aircraft but often moved 10 meters or more when ground stimuli were present.

Although few studies have been conducted on the response of wild ungulates to sonic booms, these disturbances appear to have little-to-no adverse effects. Workman et al. (1992) studied the physiological and behavioral responses of captive pronghorn, elk (*Cervus elaphus*), and bighorn sheep to sonic booms. All three species exhibited an increase in heart rate that lasted for 30 to

90 seconds in response to their first exposure to a sonic boom. Behaviorally, the animals responded to their first exposure to a sonic boom by running a short distance (less than 30 feet reported for elk). After successive sonic booms, the heart-rate response decreased greatly and the animals remained alert, but did not run. The authors suggested the animals became habituated in response to successive exposures.

B.2.6.4 Birds

Auditory research conducted on birds indicates that they fall between reptiles and mammals relative to hearing sensitivity. According to Dooling, within the range of 1,000 to 5,000 Hz, birds show a level of hearing sensitivity similar to that of the more sensitive mammals (1978). In contrast to mammals, bird auditory sensitivity falls off at a greater rate with increasing and decreasing frequencies. Observational evidence as well as studies examining aircraft bird strikes indicates that birds routinely nest, roost, and forage near airports. Aircraft noise in the vicinity of commercial airports apparently does not inhibit bird presence and use.

Raptors

Raptors have been the focus of considerable research attention with regard to the potential for adverse effects from aircraft overflight. The research focus is related to public interest in raptors; their large size; a tendency of some raptor species to nest and perch in elevated, exposed places such as cliff ledges and treetops; and the endangered or threatened status of many raptor species for reasons unrelated to overflight (e.g., pesticide induced eggshell thinning); and other metabolic effects related to exposure to pesticides through the food chain. There has been a concern that high-noise events (e.g., from a low-altitude aircraft overflight) may cause raptors to engage in escape or avoidance behaviors, such as flushing from perches or nests (Ellis et al. 1991). Concerns have been expressed that these activities could impose an energy cost on the birds that, over the long term, could affect survival or growth. In addition, the birds may spend less time engaged in necessary activities like feeding, preening, or caring for their young because they spend time in noise-avoidance activity. However, the long-term significance of noise-related impacts is less clear. For these concerns to be borne out, disturbance would need to be frequent enough for the energy costs to be cumulatively substantial and there would need to be a lack of habituation over time. Several studies on nesting raptors have indicated that birds become habituated to aircraft overflights and that long-term reproductive success is not affected by exposure to overflight (Grubb and King 1991; Ellis et al. 1991).

In a literature review of raptor responses to aircraft overflight/noise, Manci et al. found that most raptors did not show a negative response to overflights (1988). When negative responses were observed they were predominantly associated with rotary-winged aircraft or jet aircraft that were repeatedly passing within 0.5 mile (0.8 kilometers) of a nest. Many raptor-aircraft studies have been conducted since then and several are reviewed below.

In Alaska, Palmer et al. (2003) found small differences in nest attendance and time-activity budgets between undisturbed nesting peregrine falcons (*Falco peregrinus*) and those that were overflown by military aircraft within 500 feet; however, the differences were not correlated with

specific overflights nor did they affect reproductive success. Furthermore, Palmer et al. did not observe a difference in nest-provisioning rates between disturbed and undisturbed nests.

Ellis et al. (1991) estimated the effects of low-level military jet aircraft and mid-to high-altitude sonic booms (both actual and simulated) on several nesting raptor species. No incidents of reproductive failure were observed, and site re-occupancy rates were high (95 percent) the following year. Overflights by military jet aircraft (mostly A-7 Corsair IIs and A-10 Thunderbolts) within 60 meters (195 feet) of the birds most often evoked only minimal behavioral response, although they occasionally caused birds to fly from perches or eyries (Ellis et al. 1991). Jet passes greater than 500 meters (1,625 feet) from the birds consistently failed to elicit significant responses. Several researchers found that ground-based activities, such as operating chainsaws or an intruding human, were more disturbing to raptors than aircraft (White and Thurow 1985; Grubb and King 1991; Delaney et al. 1997). Red-tailed hawks (*Buteo jamaicensis*) and osprey (*Pandion haliaetus*) appeared to readily habituate to regular aircraft overflights (Andersen et al. 1989; Trimper et al. 1998).

Mexican Spotted Owl (MSO). In a 1997 helicopter overflight study, MSO did not flush from a nest or perch unless a helicopter was as close as 330 feet (Delaney et al. 1997). Researchers in Colorado found that MSO responses to F-16 overflights exhibited minimal responses at elevations of 1,500 feet above canyon rims where owls were day-roosting at elevations ranging from 650 to 975 feet below the canyon rims, which would put the overflight level at approximately 2,150 to 2,475 feet above the MSOs (Johnson and Reynolds 2002). The observers also noted that MSO responses to the F-16 overflights were often less significant than responses to naturally occurring events such as thunderstorms. Similarly, Delaney et al. (1999) found that the MSOs quickly returned to normal day-roosting behavior after being disturbed by helicopters. A 6-year study conducted by Air Combat Command (ACC 2008) found that aircraft overflight had no effect on occupancy of MSO activity centers and found no correlations among measures of aircraft exposure and nesting success. Additionally, no flushing or loss of adults or young was observed in response to any aircraft overflights, including 40 observations of military jet aircraft overflight that came within 500 feet of nesting owls. This study also found that natural habitat characteristics such as topography, forest cover, distance to water sources, and precipitation were better predictors of nesting success than exposure to aircraft overflight.

Bald Eagle. The effects of aircraft overflight on the bald eagle (*Haliaeetus leucocephalus*) have been studied relatively well, compared to most wildlife species. Bald eagle behavioral responses, varying from altering posture to taking flight and/or departing the area, have been associated with overflights of jets, helicopters, and light planes (Grubb and Bowerman 1997). One study observed 47 percent of wintering bald eagles flushed when approached closer than 984 feet (300 meters) with Army helicopters; however, few eagles flushed in response to helicopter traffic staying over 300 meters in the same areas (Stalmaster and Kaiser 1997).

Overall, there have been no reports of reduced reproductive success or physiological risks to bald eagles exposed to aircraft overflights or other types of military noise and habituation behavior was observed in several studies (Fraser et al. 1985; Stalmaster and Kaiser 1997; Grubb and Bowerman 1997; Brown et al. 1999; see review in Buehler 2000). Most researchers have documented that pedestrians and helicopters were more disturbing to bald eagles than

fixed-wing aircraft, including military jets (Fraser et al. 1985; Grubb and King 1991; Grubb and Bowerman 1997). Recorded responses to 779 events involving military jet aircraft at median distances of 500 meters ranged from no response (67 percent), an alert posture (29 percent), taking flight (3 percent), or temporarily departing the immediate area (1 percent). Median approach distance for the few instances of eagles taking flight was 200 meters. There was considerably more reaction to helicopters than to jets or light planes (Grubb and King 1991; Grubb and Bowerman 1997). In their 1997 study, Grubb and Bowerman recommended a buffer of 1,968 feet (600 meters) around bald eagle nests for all aircraft during the breeding season.

Golden Eagle. In their guidelines for aerial surveys, USFWS (Pagel et al. 2010) summarized past studies by stating that most golden eagles respond to survey aircraft (fixed wing and helicopters) by remaining on their nests, and continuing to incubate or roost. Surveys take place generally as close as 10 to 20 meters from cliffs (including hovering less than 30 seconds if necessary to count eggs) and no farther than 200 meters from cliffs depending on safety (Pagel et al. 2010).

Grubb et al. (2007) experimented with multiple exposure to two helicopter types and concluded that flights with a variety of approach distances (800, 400, 200, and 100 meters) had no effect on golden eagle nesting success or productivity rates within the same year or on rates of renewed nesting activity the following year when compared to the corresponding figures for the larger population of non-manipulated nest sites (Grubb et al. 2007). They found no significant, detrimental, or disruptive responses in 303 helicopter passes near eagles. In 227 AH-64 Apache helicopter experimental passes (considered twice as loud as a civilian helicopter also tested) at test distances of 0–800 meters from nesting golden eagles, 96 percent resulted in no more response than watching the helicopter pass. No greater reactions occurred until after hatching when individual golden eagles exhibited five flatten and three fly behaviors at three nest sites. The flight responses occurred at approach distances of 200 meters or less. No evidence was found of an effect on subsequent nesting activity or success, despite many of the helicopter flights occurring during early courtship and nest repair. None of these responding pairs failed to successfully fledge young, except for one nest that fell later in the season. Excited, startled, avoidance reactions were never observed. Non-attending eagles or those perched away from the nests were more likely to fly than attending eagles, but also with less potential consequence to nesting success (Grubb et al. 2007). Golden eagles appeared to become less responsive with successive exposures. Much of helicopter sound energy may be at a lower frequency than golden eagles can hear, thus reducing expected impacts. Grubb et al. (2007) found no relationship between helicopter sound levels and corresponding eagle ambient behaviors or limited responses, which occurred throughout recorded test levels (76.7–108.8 dB, unweighted). The authors thought that the lower than expected behavioral responses may be partially due to the fact that the golden eagles in the area appear acclimated to the current high levels of outdoor recreational, including aviation, activities. Based on the results of this study, the authors recommended reduction of existing buffers around nest sites to 100 meters (325 feet) for helicopter activity.

Richardson and Miller (1997) reviewed buffers as protection for raptors against disturbance from ground-based human activities. No consideration of aircraft activity was included. They stressed a clear line of sight as an important factor in a raptor's response to a particular disturbance, with visual screening allowing a closer approach of humans without disturbing a

raptor. A GIS-assisted viewshed approach combined with a designated buffer zone distance was found to be an effective tool for reducing potential disturbance to golden eagles from ground-based activities (Richardson and Miller 1997). They summarized recommendations that included a median 0.5-mile (800-meter) buffer (range = 200-1,600 m, n = 3) to reduce human disturbances (from ground-based activities such as rock climbing, shooting, vehicular activity) around active golden eagle nests from February 1 to August 1 based on an extensive review of other studies (Richardson and Miller 1997). Physical characteristics (i.e., screening by topography or vegetation) are important variables to consider when establishing buffer zones based on raptors' visual- and auditory-detection distances (Richardson and Miller 1997).

Osprey. A 1998 study by Trimper et al. in Goose Bay, Labrador, Canada, focused on the reactions of nesting osprey to military overflights by CF-18 Hornets (a Canadian twin-engine jet attack aircraft similar to the F/A-18 Hornet used by U.S. Navy and Marine Corps). Reactions varied from increased alertness and focused observation of planes to adjustments in incubation posture. No overt reactions (e.g., startle response, rapid nest departure) were observed as a result of an overflight. Young nestlings crouched as a result of any disturbance until they grew to 1 to 2 weeks prior to fledging. Helicopters, human presence, floatplanes, and other ospreys elicited the strongest reactions from nesting ospreys. These responses included flushing, agitation, and aggressive displays. Adult ospreys showed high nest occupancy rates during incubation regardless of external influences.

The osprey observed occasionally stared in the direction of the flight before it was audible to the observers. The birds may have become habituated to the noise of the flights; however, overflights were strictly controlled during the experimental period. Strong reactions to float planes and helicopter may have been due to the slower flight and therefore longer duration of visual stimuli rather than noise-related stimuli.

Red-Tailed Hawk. Andersen et al. (1989) investigated the effects of low-level helicopter overflights (0.3 miles [500 meters] and below to 98 feet [30 meters] AGL) and habituation on red-tailed hawk nests at two Army installations. Naïve hawks (i.e., not previously exposed to helicopter flights) exhibited flushing at much greater distances (mean 100 meters) than did hawks at the same locations when overflights were repeated the next year (mean distance of 17 meters and 10 meters for the two installations). Flushing occurred at similar percentages of total nests both years. The overflights did not appear to affect nesting success in either study group. These findings were consistent with the belief that red-tailed hawks habituate to low-level overflight, even during the nesting period.

Upland Game Birds

Greater Sage-grouse. The greater sage-grouse was recently designated as a candidate species for protection under the Endangered Species Act after many years of scrutiny and research (USFWS 2010). This species is a widespread and characteristic species of the sagebrush ecosystems in the Intermountain West. Greater sage-grouse, like most bird species, rely on auditory signals as part of mating. Sage-grouse are known to select their leks based on acoustic properties and depend on auditory communication for mating behavior (Braun 2006). Although little specific research has been completed to determine what, if any, effects aircraft overflight and sonic booms would have on the breeding behavior of this species, factors that

may be important include season and time of day, altitude, frequency, and duration of overflights, and frequency and loudness of sonic booms.

Booth et al. (2009) found, while attempting to count sage-grouse at leks (breeding grounds) using light sport aircraft at 150 meters (492 feet) to 200 meters (650 feet) AGL, that sage-grouse flushed from leks on 12 of 14 approaches when the airplane was within 656 to 984 feet (200–300 meters) of the lek. In the other two instances, male grouse stopped exhibiting breeding behavior and crouched but stayed on the lek. The time to resumption of normal behavior after disturbance was not provided in this study. Strutting ceased around the time when observers on the ground heard the aircraft. The light sport aircraft could be safely operated at very low speed (68 kilometers/hour or 37 nautical miles/hour) and was powered by either a two-stroke or a four-stroke engine. It is unclear how the response to the slow-flying light sport aircraft used in the study would compare to overflight by military jets, operating at speeds 10–12 times as great as the aircraft used in the study. It is possible that response of the birds was related to the slow speed of the light sport aircraft causing it to resemble an aerial predator.

Other studies have found disturbance from energy operations and other nearby development have adversely affected breeding behavior of greater sage-grouse (Holloran 2005; Doherty 2008; Walker et al. 2007; Harju et al. 2010). These studies do not specifically address overflight and do not isolate noise disturbance from other types (e.g., visual, human presence) nor do they generally provide noise levels or qualification of the noise source (e.g., continuous or intermittent, frequency, duration).

Because so few studies have been done on greater sage-grouse response to overflights or sonic booms, research on related species may be applicable. Observations on other upland game bird species include those on the behavior of four wild turkey (*Meleagris gallapavo*) hens on their nests during real and simulated sonic booms (Manci et al. 1988). Simulated sonic booms were produced by firing 5-centimeter mortar shells, 300–500 feet from the nest of each hen. Recordings of pressure for both types of booms measured 0.4–1.0 pounds per square foot (psf) at the observer's location. Turkey hens exhibited only a few seconds of head alert behavior at the sound of the sonic boom. No hens were flushed off the nests, and productivity estimates revealed no effect from the booms. Twenty brood groups were also subjected to simulated sonic booms. In no instance did the hens desert any poults (young birds), nor did the poults scatter or desert the rest of the brood group. In every observation, the brood group returned to normal activity within 30 seconds after a simulated sonic boom. Similarly, researchers cited in Manci et al. (1988) observed no difference in hatching success of bobwhite quail (*Colinus virginianus*) exposed to simulated sonic booms of 100–250 micronewtons per square meter.

Lesser Prairie-chicken. The lesser prairie-chicken (*Tympanuchus pallidicinctus*) is an umbrella species for the short- and mixed-grass prairie ecosystem of the south-central United States (Pruett et al. 2009). This upland grouse species shares many characteristics with the greater sage-grouse and is showing similar population declines. Some declines corresponded with the past losses of and degradation of quality prairie habitat by land use practices and fire. But since the 1980s, lesser prairie chicken numbers have continued to decline despite the near cessation of large-scale land conversion for agriculture. Research generally points to low nest success and poor chick survival as the most important contributing factors (Robel et al. 2004). In addition, the lesser prairie-chicken has shown some sensitivity to human activities that can limit its

occupied range (USFWS and BLM 2008; Davis et al. 2008; Pruett et al. 2009). The species has been an ESA candidate for listing for over 10 years. No studies on aircraft overflight effects to lesser prairie-chicken were found.

It is not fully understood what adverse effects to the lesser prairie-chicken are caused by human disturbances. Noise and movement of anthropogenic features may play an important part of detrimental cumulative effects, including pump jacks at wellheads, center-pivot irrigation booms, and vehicles on roads (Robel et al. 2004). A study in Kansas showed that lesser prairie-chickens seldom nest within 200 yards of oil or gas wellheads, 400 yards of power lines, 860 yards of improved roads, and 1,370 yards of large structures (Robel et al. 2004). The authors measured the distance at which noise from these features were audible to investigators, recording 0.6 mile for the irrigation center-pivots to over 2 miles for gas compressor stations. Studies to determine whether noise from oil drilling may have played a role in the abandonment of a number of historically active lek sites near Carlsbad, New Mexico found that the vicinity of abandoned leks had more active wells, more total wells, and greater length of road than the vicinity of active leks, and were more likely than active leks to be near power lines (Hunt 2004). Predation and collisions with fences, power lines, and vehicles remain the greatest direct causes of mortality for the species.

As described for greater sage-grouse, the lesser prairie-chicken breeds at leks and relies on auditory signals as part of mating. Although little specific research has been completed to determine what, if any, effects aircraft overflight and sonic booms would have on the breeding behavior of this species, factors that may be important include season and time of day, altitude, duration, and frequency of overflights, and frequency and loudness of sonic booms, if any.

Songbirds

The effect of overflight activity on songbirds has historically received little attention at least partially because most songbirds rely on concealment of nests in vegetation cover to avoid predation and are thus not exposed to the visual aspect to overflight. Additionally some species show a high tolerance to human presence, urban noise, and disturbance.

Songbirds were observed to become silent prior to the onset of a sonic boom (F-111 jets), followed by "raucous discordant cries" for a few seconds. There was a return to normal singing within 10 seconds after the boom (Manci et al. 1988). The silence of the birds coincided with the arrival of a seismic signal propagated through the ground 4 to 8 seconds prior to the audible boom. Ravens responded to sonic booms by emitting protestation calls, flapping their wings, and soaring, returning to normal behavior within a few minutes.

It has been observed that songbirds are not driven any great distance from a favored food source by a nonspecific disturbance, such as aircraft overflights (USFS 1992). Another study found that California gnatcatchers (a small songbird) on Naval Air Station Miramar might tend to build fewer nests and lay fewer eggs in noisier areas (nest attempts and eggs laid have weak negative correlations with one week average sound levels). The tendency to build fewer nests and lay fewer eggs in noisier areas is consistent with the common observation that bird nesting is more easily disturbed before eggs are laid than after. Once a nest is established with eggs in it, however, military aircraft noise had no detectable influence on reproductive performance

(Awbrey and Hunsaker 1997). A series of studies focused on busy multilane highways have indicated that road noise has a negative effect on bird populations (particularly during breeding) in a variety of species (Kaseloo 2006) that diminishes with distance from the highway. In contrast to noise from jet overflight, which is generally intermittent, noise from busy highways is nearly continuous, which magnifies adverse effects such as masking or interference with communication.

A study conducted cooperatively between the DoD and the U.S. Fish and Wildlife Service (USFWS) assessed the response of the red-cockaded woodpecker to a range of military training noise events, including artillery, small arms, helicopter, and maneuver noise (Delaney et al. 2002). The study did not address overflight except by helicopters. The findings suggested that the red-cockaded woodpecker can successfully acclimate to military noise events depending on the noise. During those events, the birds responded by flushing from their nest cavities, increasing flushes increased proportionately with closer noise sources. In all cases, however, the birds returned to their nests within a relatively short period of time (usually within 12 minutes). Additionally, the noise exposure did not result in any mortality or statistically detectable changes in reproductive success (Delaney et al. 2002). Red-cockaded woodpeckers did not flush when artillery simulators were more than 122 meters away and SEL noise levels were 70 dBA.

Water Birds

In their review, Manci et al. (1988) noted that aircraft can be particularly disturbing to waterfowl. The USFWS Waterfowl Management Handbook (Korschgen and Dahlgren 1992) lists "loud noise" as caused by aircraft as the top disturbance category for waterfowl. Several studies showed that migratory waterfowl (e.g., ducks and geese) expend more energy when exposed to repeated aircraft overflights, at least in the short term (Bowles 1995). Waterfowl are sensitive to disturbance because of their aggregation into large flocks during their migration and overwintering. When at rest, the flocks are typically in waterbodies or wetlands exposed to the open sky and subject to aerial and ground predation. Taking flight is their defense against either types of predation. Waterfowl flocks seem to be as sensitive as their most responsive individual in the flock is, so that larger flocks would have a greater chance of responding than small ones (Bowles 1995). A variety of studies cited in Bowles (1995) has indicated that migratory waterfowl exposed to overflights by light aircraft and helicopters did not habituate completely to overflight. Due to the danger to aircraft and aircrews posed by potential collisions with waterfowl and other flocking birds, the Bird-Aircraft Strike Hazard (BASH) has received much attention by the military. BASH programs exist at every air installation and areas where low-level aircraft flight training takes place (e.g., military training routes [MTRs]) have locations of seasonal concentrations of waterfowl identified and guidance for pilots with regard to elevational or lateral separation from these sites at specific seasons and times of day to avoid or minimize the potential for collision. This avoidance in turn reduces the potential for disturbance of migratory waterfowl concentrations by military aircraft overflight.

Conomy et al. (1998) suggested that responses of waterfowl to aircraft noise may be species-specific. They found that black ducks (*Anas rubripes*) exposed to noise under experimental conditions were able to habituate to aircraft noise, while wood ducks (*Aix sponsa*) were not. Black ducks exhibited a significant decrease in startle response to actual and

simulated jet aircraft noise over a 17-day period, but wood duck response did not decrease uniformly following initial exposure. Some bird species appear to be more sensitive to aircraft noise at different times of the year.

Snow geese (*Chen caerulescens*) were more easily disturbed by aircraft prior to fall migration than at the beginning of the nesting season (Belanger and Bedard 1989). On an autumn staging ground in Alaska (i.e., prior to fall migration), 75 percent of brant (*Branta bernicla*) and only 9 percent of Canada geese (*Branta canadensis*) flew in response to aircraft overflights (Ward et al. 1999). Although mean response of brant and Canada geese generally was inversely proportional to aircraft altitude, there was a greater response to aircraft at 1,000 to 2,500 feet AGL than at lower or higher altitudes. The Ward et al. (1999) study used several types of commercial fixed wing and rotary wing aircraft for 356 overflights over four years.

Few studies show responses of water birds to sonic booms. One widely cited report discussed by Manci et al. (1988) was inconclusive regarding the cause of the reproductive failure of a colony of sooty terns (*Sterna fuscata*) on the Dry Tortugas in 1969 as to whether behavioral response of adults to sonic booms from extremely low-flying military jets (<100 meters AGL) or overgrowth of island vegetation were causal factors (Gladwin et al. 1988). Actions were taken to curb planes breaking the sound barrier within range of the Tortugas, and much of the excess vegetation was cleared. In mid-May 1970, the birds appeared to be having a normal nesting season. Laboratory tests of exposure of eggs to sonic booms and other impulsive noises (Bowles et al. 1991; Bowles et al. 1994; Cogger and Zegarra 1980) failed to show adverse effects on the hatching of eggs. A structural analysis (Ting et al. 2002) showed that, even under extraordinary circumstances, sonic booms would not damage an avian egg.

Black et al. (1984) studied the effects of low-altitude (primarily over 500 feet AGL) military training flights with sound levels from 55 to 100 dBA on wading bird colonies (i.e., great egret, snowy egret, tricolored heron, and little blue heron). The training flights involved three or four F-16 aircraft and occurred once or twice per day. This study concluded that the reproductive activity—including nest success, nestling survival, and nestling chronology—was independent of F-16 overflights. Dependent variables were more strongly related to ecological factors, including location and physical characteristics of the colony and climatology.

Kushlan (1979) did not observe any negative effects on wading bird colonies (i.e., rookeries) when circling fixed-wing aircraft conducted surveys within 200 feet AGL; 90 percent of the 220 observations indicated no reactions to overflight or heads turning from the birds. Another 6 percent stood up, 3 percent walked from the nest, and 2 percent flushed (but were without active nests) and returned within 5 minutes (Kushlan 1979). Apparently, non-nesting wading birds had a slightly higher incidence of reacting to overflights than nesting birds. Colony distribution of wading birds appeared to be most directly correlated to available wetland community types and was found to be distributed randomly with respect to military training routes. These results suggest that presence of wading bird species was most closely linked to habitat availability and that they were not affected by low-level military overflights (Air Force 2000).

Burger (1986) studied the response of migrating shorebirds to human disturbance in two New Jersey estuaries and found that shorebirds did not fly in response to aircraft overflights, but did flush in response to more localized intrusions (i.e., humans and dogs on the beach).

Burger (1981) also studied the effects of overflight noise from JFK Airport in New York on herring gulls (*Larus argentatus*) that nested less than 1 kilometer from the airport. The study compared the response of the birds to overflight by conventional subsonic jetliners (Boeing 707, 727, 747) and the supersonic Concorde, a passenger jet formerly used for supersonic transatlantic flight that was well known for the noise and vibration produced on takeoff and landing approach when flying subsonically. Noise levels over the nesting colony were recorded as 85 to 100 dBA on approach and 94 to 105 dBA on takeoff for most aircraft, including conventional jetliners. Generally, there did not appear to be any adverse effects of takeoff and landing noise on nesting birds from conventional jetliners. No sonic booms were heard in this study because flight in the vicinity of the airport was all subsonic. However, birds flushed when a Concorde flew directly overhead (producing 116 dBA sound and ground vibrations) and birds engaged in significantly more aggressive behavior once they returned to the colony compared with the normal conditions, including eggs being broken. The adverse response was attributed to fighting among birds from neighboring territories returning to the nesting colony after being simultaneously flushed when the Concorde flew overhead. Groups of gulls tended to loaf in the area of the nesting colony, and these resting birds were not disturbed when conventional jetliners flew overhead but all took flight when the Concorde flew overhead, which occurred only once or twice daily (Burger 1981).

B.2.6.5 Fish, Reptiles, and Amphibians

The effects of overflight noise on fish, reptiles, and amphibians have been poorly studied, but conclusions regarding their expected responses have involved speculation based upon known physiologies and behavioral traits of these taxa (Gladwin et al. 1988). Transmission of sound from air to water takes place under limited conditions but sound is conducted very efficiently in water. Yearling rainbow trout exposed to sonic boom (4.16 psf overpressure) showed "no" to "very slight" behavioral reaction and no physiological reactions compared to controls. Eggs of cutthroat trout, steelhead/rainbow trout, and Chinook salmon exposed to sonic booms from military jets (up to 4.16 psf overpressure) during a critical stage of development showed no increase in mortality compared to unexposed eggs spawned at the same time (Manci et al. 1988).

Desert Tortoise. A comprehensive study of effects of low-level jet overflights on desert tortoises demonstrated no significant adverse effects, despite the fact that these reptiles showed high hearing sensitivity and that several physiologic functions were measured (Bowles et al. 1999). Tortoise responses documented under overflight and sonic boom conditions typical of military operations areas did not include damage to hearing, voiding of urine, or even acoustic startle responses. Temporary "freezing" (i.e., remaining immobile), a typical reptilian defensive response, was noted after initial exposure to intense overflight noise. No significant adverse physiological changes or effects were measured (e.g., heart rate, metabolic rate). Subsequent aircraft noise exposure produced tortoise responses, such as head withdrawals, alerting, and less climbing or digging, that diminished dramatically indicating habituation. Sonic boom responses were limited to brief bouts of alerting (Bowles et al. 1999). This study concluded that

none of the desert tortoise responses to low level aircraft overflights or sonic booms was detrimental to the animals.

B.2.6.6 Summary

Some physiological/behavioral responses such as increased hormonal production, increased heart rate, and reduction in milk production have been described in a small percentage of studies. A majority of the studies focusing on these types of effects have reported short-term or no effects.

The relationships between physiological effects and how species interact with their environments have not been thoroughly studied. Therefore, the larger ecological context issues regarding physiological effects of jet aircraft noise (if any) and resulting behavioral pattern changes are not well understood.

Animal species exhibit a wide variety of responses to noise. It is therefore difficult to generalize animal responses to noise disturbances or to draw inferences across species, as reactions to jet aircraft noise appear to be species-specific. Consequently, some animal species may be more sensitive than other species and/or may exhibit different forms or intensities of behavioral responses. For instance one study suggests that wood ducks appear to be more sensitive and more resistant to acclimation to jet aircraft noise than Canada geese. Similarly, wild ungulates seem to be more easily disturbed than domestic animals.

The literature does suggest that common responses include the "startle" or "fright" response and, ultimately, habituation. It has been reported that the intensities and durations of the startle response decrease with the numbers and frequencies of exposures, suggesting no long-term adverse effects. The majority of the literature suggests that domestic animal species (cows, horses, chickens) and wildlife species exhibit adaptation, acclimation, and habituation after repeated exposure to jet aircraft noise and sonic booms.

Animal responses to aircraft noise appear to be somewhat dependent on, or influenced by, the size, shape, speed, proximity (vertical and horizontal), engine noise, color, and flight profile of planes. Helicopters also appear to induce greater intensities and durations of disturbance behavior as compared to fixed-wing aircraft. Some studies showed that animals that had been previously exposed to jet aircraft noise exhibited greater degrees of alarm and disturbance to other objects creating noise, such as boats, people, and objects blowing across the landscape. Other factors influencing response to jet aircraft noise may include wind direction, speed, and local air turbulence; landscape structures (i.e., amount and type of vegetative cover); and, in the case of bird species, whether the animals are in the incubation/nesting phase.

B.2.7 Property Values

There are a number of factors that affect property values, which makes predicting impacts difficult. Factors directly related to the property, such as size, improvements, and location of the property, as well as current conditions in the real estate market, interest rates, and housing sales in the area are more likely to have a direct adverse impact on property values. Several studies have analyzed property values as they relate to military and civilian aircraft noise. In one study, a regression analysis of property values as they relate to aircraft noise at two military

installations was conducted (Fidell et al. 1996). This study found that, while aircraft noise at these installations may have had minor impacts on property values, it was difficult to quantify that impact. Other factors such, as the quality of the housing near the installations and the local real estate market, had a larger impact on property values. Therefore, the regression analysis was not able to predict the impact of aircraft noise on the property values of two comparable properties.

Another study analyzed 33 other studies attempting to quantify the impact of noise on property values (Nelson 2003). The result of the study supports the idea that the potential for an adverse impact on property values as a result of aircraft noise exists and estimates that the value of a specific property could be discounted between 0.5 and 0.6 percent per decibel when compared to a similar property that is not impacted by aircraft noise. Additional data indicates that the discount for property values as a result of noise would be higher for noise levels above 75 dB DNL.

B.2.8 Noise Effects on Structures

B.2.8.1 Subsonic Aircraft Noise

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at sound levels above 130 dB, there is the possibility of the excitation of structural component resonance. While certain frequencies (such as 30 Hz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (CHABA 1977). A study directed specifically at low-altitude, high-speed aircraft showed that there is little probability of structural damage from such operations (Sutherland 1990). One finding in that study is that sound levels at damaging frequencies (e.g., 30 Hz for window breakage or 15 to 25 Hz for whole-house response) are rarely above 130 dB.

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. In general, such noise-induced vibrations occur at sound levels above those considered normally incompatible with residential land use. Thus assessments of noise exposure levels for compatible land use should also be protective of noise-induced secondary vibrations.

Noise levels exceeding 115 dB SEL are of particular concern because some researchers have suggested that noise above this level may cause a temporary hearing threshold shift in exposed persons. The average number of F-35A overflights per year generating greater than 115 dB SEL at any given location underneath the MTR corridor centerline was calculated based on F-35A operations parameters derived from repeated flight simulator runs and assuming statistically 'normal' distribution of flights across the MTR corridor width (Lucas and Plotkin 1988). For each MTR, the narrowest route segment was used to calculate the highest concentration of operations near the centerline. For each combination of engine power setting and altitude band (lowest altitude in each band used) that was used on MTRs, the lateral distance at which the

sound level dropped below 115 dB SEL was calculated. It was found that 80 percent of the total time spent on an MTR was spent at aircraft engine power settings of 50 percent ETR or below, with the remainder of the time spent at higher engine power settings. Approximately 70 percent of total time was spent at altitudes between 500 and 750 feet AGL, with the remaining time being spent at altitudes between 750 and 1,500 feet AGL. Based on a statistically normal distribution of flights across the MTR corridor width, the probability of an aircraft being within this lateral distance of the route centerline was calculated. The probability of the aircraft being at a particular power setting and altitude band was multiplied by the probability of the aircraft being within the calculated lateral distance of the corridor centerline. Each value in the resulting matrix of probabilities was multiplied by the number of MTR sortie-operations per year to yield the average number of events exceeding 115 dB SEL per year for a location directly underneath the MTR centerline.

B.2.8.2 Sonic Booms

Sonic booms are commonly associated with structural damage. Most damage claims are for brittle objects, such as glass and plaster. Table B–6 summarizes the threshold of damage that might be expected at various overpressures. There is a large degree of variability in damage experience, and much damage depends on the pre-existing condition of a structure. Breakage data for glass, for example, spans a range of two to three orders of magnitude at a given overpressure. At 1 psf, the probability of a window breaking ranges from one in a billion (Sutherland 1990) to one in a million (Hershey and Higgins 1976). These damage rates are associated with a combination of boom load and glass condition. At 10 psf, the probability of breakage is between one in a hundred and one in a thousand. Laboratory tests of glass (White 1972) have shown that properly installed window glass will not break at overpressures below 10 psf, even when subjected to repeated booms, but in the real world glass is not in pristine condition.

Damage to plaster occurs at similar ranges to glass damage. Plaster has a compounding issue in that it will often crack due to shrinkage while curing, or from stresses as a structure settles, even in the absence of outside loads. Sonic boom damage to plaster often occurs when internal stresses are high from these factors.

Some degree of damage to glass and plaster should thus be expected whenever there are sonic booms, but usually at the low rates noted above. In general, structural damage from sonic booms should be expected only for overpressures above 10 psf.

Table B–6. Possible Damage to Structures From Sonic Booms

Sonic Boom Overpressure Nominal (psf)	*Type of Damage*	*Item Affected*
0.5 - 2	Plaster	Fine cracks; extension of existing cracks; more in ceilings; over door frames; between some plaster boards.
	Glass	Rarely shattered; either partial or extension of existing.
	Roof	Slippage of existing loose tiles/slates; sometimes new cracking of old slates at nail hole.
	Damage to outside walls	Existing cracks in stucco extended.
	Bric-a-brac	Those carefully balanced or on edges can fall; fine glass, such as large goblets, can fall and break.
	Other	Dust falls in chimneys.
2 - 4	Glass, plaster, roofs, ceilings	Failures show that would have been difficult to forecast in terms of their existing localized condition. Nominally in good condition.
4 - 10	Glass	Regular failures within a population of well-installed glass; industrial as well as domestic greenhouses.
	Plaster	Partial ceiling collapse of good plaster; complete collapse of very new, incompletely cured, or very old plaster.
	Roofs	High probability rate of failure in nominally good state, slurry-wash; some chance of failures in tiles on modern roofs; light roofs (bungalow) or large area can move bodily.
	Walls (out)	Old, free standing, in fairly good condition can collapse.
	Walls (in)	Inside (“party”) walls known to move at 10 psf.
Greater than 10	Glass	Some good glass will fail regularly to sonic booms from the same direction. Glass with existing faults could shatter and fly. Large window frames move.
	Plaster	Most plaster affected.
	Ceilings	Plaster boards displaced by nail popping.
	Roofs	Most slate/slurry roofs affected, some badly; large roofs having good tile can be affected; some roofs bodily displaced causing gale-end and will-plate cracks; domestic chimneys dislodged if not in good condition.
	Walls	Internal party walls can move even if carrying fittings such as hand basins or taps; secondary damage due to water leakage.
	Bric-a-brac	Some nominally secure items can fall; e.g., large pictures, especially if fixed to party walls.

Source: Haber and Nakaki 1989.

B.2.9 Noise Effects on Structure and Terrain

B.2.9.1 Subsonic Aircraft Noise

Members of the public often believe that noise from low-flying aircraft can cause avalanches or landslides by disturbing fragile soil or snow structures in mountainous areas. There are no known instances of such effects, and it is considered improbable that such effects will result from routine, subsonic aircraft operations.

B.2.9.2 Sonic Booms

In contrast to subsonic noise, sonic booms are considered to be a potential trigger for snow avalanches. Avalanches are highly dependent on the physical status of the snow, and do occur spontaneously. They can be triggered by minor disturbances, and there are documented accounts of sonic booms triggering avalanches. Switzerland routinely restricts supersonic flight during avalanche season. Landslides are not an issue for sonic booms. There was one anecdotal report of a minor landslide from a sonic boom generated by the Space Shuttle during landing, but there is no credible mechanism or consistent pattern of reports.

B.2.10 Noise Effects on Historical and Archaeological Sites

Because of the potential for increased fragility of structural components of historical buildings and other historical sites, aircraft noise may affect such sites more severely than newer, modern structures. Most scientific studies of the effects of noise and vibration on historic properties have considered potential impacts on standing architecture. For example, the FAA published a study of potential impacts resulting from vibrations caused by the noise of subsonic Concorde overflights on five historic properties, including a restored plantation house, a stone bridge and tollhouse, and other structures (Hershey et al. 1975). This study analyzed the breakage probabilities of structural elements that might be considered susceptible to vibration, such as window glass, mortar, and plaster. The results indicated that, with the exception of some already cracked window glass, there was no practical risk of noise-induced vibration damage to any of these structures.

Some studies of the effects of overflights—both subsonic and supersonic—on archaeological structures and other types of sites also have been published. Battis examined the effects of low-altitude overflights of B-52, RF-4C, and A-7 aircraft on standing walls at Long House Ruin in northeastern Arizona (Battis 1988). The motion levels observed during all passes were well below a conservative threshold for vibration in ancient structures, a level of 1.3 millimeters per second, established by two previous studies. Battis concluded that vibration associated with aircraft overflights at speeds and altitudes similar to those measured in his study had/would have no significant damaging effect on Long House and similar sites.

Two Air Force-sponsored studies have included research into potential effects of supersonic overflight on "nonstructural" archaeology and unconventional structures. One study included historic buildings, prehistoric structures, water tanks, archaeological cave/shelter sites and rock art, and seismically sensitive areas such as avalanche and mud/rock slide areas (Sutherland et al. 1990). That study compared overpressure associated with different types of aircraft in supersonic flight at different altitudes with failure or damage stress values for these types of

sites. The authors concluded that overpressures generated by supersonic overflight were well below established damage thresholds. Subsonic operations—which were not included in this study—would be even less likely to cause damage.

Battis also completed a study that examined the potential for damage by sonic booms to rock shelter and petroglyph sites located within the Valentine Military Operations Area (MOA) in Texas (Battis 1983). The Texas State Historic Preservation Office (SHPO) helped design and participated in this study, which involved taking measurements at a rock shelter site and at a field of petroglyphs-bearing boulders during supersonic overflights. The peak overpressure for booms generated during supersonic operations over the Valentine MOA was 5.2 psf. The lower limit (the least amount of pressure needed) for damaging rock was measured in the laboratory at 2.1 × 104 psf, 4,000 times the peak overpressure measured during the study.

Air Force National Environment Policy Act documents have examined the potential impacts on historic properties that might result from subsonic and supersonic overflights. In 1995, the Air Force published the *Environmental Assessment for Continued Supersonic Operations in the Black Mountain Supersonic Corridor and the Alpha/Precision Impact Range Area*. Eligible and potentially eligible cultural resources in the area of potential effect include petroglyph and pictograph panels located on a variety of rock types, historic adobe and non-adobe structures with standing walls, and historic mines (which contain tunnels) and wells. The report concludes that supersonic low-altitude flights have occurred over these corridors for 25 years or more and have resulted in no significant impacts on cultural resources. The California SHPO agreed, and during National Historic Preservation Act Section 106 review of this undertaking, concurred with the Air Force's finding that continued supersonic overflights would have no effect on historic properties.

As noted above for the noise effects of noise-induced vibrations on normal structures, assessments of noise exposure levels for normally compatible land uses should also be protective of historic and archaeological sites.

B.3 Noise Modeling

B.3.1 Subsonic Aircraft Noise

An aircraft in subsonic flight generally emits noise from two sources: the engines and flow noise around the airframe. Noise generation mechanisms are complex and, in practical models, the noise sources must be based on measured data. The Air Force has developed a series of computer models and aircraft noise databases for this purpose. The models include NOISEMAP (Moulton 1991) for noise around airbases, and MOA-Range NOISEMAP (MR_NMAP) (Lucas and Calamia 1996) for use in MOAs, ranges, and low-level training routes. These models use the NOISEFILE database developed by the Air Force. Reference sound levels associated with overflight of a particular aircraft type in a particular configuration are measured using microphone array for inclusion in the NOISEFILE database. NOISEFILE data includes SEL and L_{Amax} as a function of speed and power setting for aircraft in straight flight.

Noise from an individual aircraft is a time-varying continuous sound. It is first audible as the aircraft approaches, increases to a maximum when the aircraft is near its closest point of approach, then diminishes as it departs. The noise depends on the speed and power setting of the aircraft and its trajectory. The models noted above divide the trajectory into segments whose noise can be computed from the data in NOISEFILE. The contributions from these segments are summed. NOISEMAP results have been checked against recorded noise levels and found to be accurate within 1.5 dB with 90 percent statistical confidence (Lee 1982).

NOISEMAP uses representative flight tracks and flight profiles as inputs in noise level calculation. Representative flight profiles, which include engine power setting, altitude, and airspeed at several points along the flight track, are typically derived from pilot interviews, but may also be derived from other sources such as recorded flight simulator data.

NOISEMAP calculations in this Environmental Impact Statement use a topographic effects model that accounts for terrain effects on noise propagation. Terrain effects include the degree to which different ground types absorb sound (water surfaces do not absorb sound energy) and ground elevation (i.e., closeness of ground to aircraft and acoustic blocking due to terrain). The effects of atmospheric conditions such as temperature and relative humidity on sound propagation are accounted for by using average conditions from the month with the median acoustic atmospheric attenuation value. NOISEMAP propagation algorithms do not explicitly include the effects of wind on sound propagation, but propagation in all directions is calculated as if the sound were propagating downwind, which is favorable for propagation (and unfavorable for noise levels).

MR_NMAP was used to compute noise levels in the airspace. The primary noise metric computed by MR_NMAP was L_{dnmr} averaged over each airspace. Supporting routines from NOISEMAP were used to calculate SEL and L_{Amax} for various flight altitudes and lateral offsets from a ground receiver position. The model MR_NMAP represents semi-random operations in training airspace. Operations in Special Use Airspace units are modeled as being uniformly distributed across the airspace with tapering of operations concentration near training airspace boundaries. MTR operations are modeled as being distributed across the MTR corridor width according to a normal distribution (Lucas and Plotkin 1988). MR_NMAP does not account for local variations in terrain such as ravines and mountains. Variability in aircraft altitude over the course of a training sortie is taken into account in development of percentage of total training time spent in specific altitude bands.

B.3.2 Sonic Booms

When an aircraft moves through the air, it pushes the air out of its way. At subsonic speeds, the displaced air forms a pressure wave that disperses rapidly. At supersonic speeds, the aircraft is moving too quickly for the wave to disperse, so it remains as a coherent wave. This wave is a sonic boom. When heard at the ground, a sonic boom consists of two shock waves (one associated with the forward part of the aircraft, the other with the rear part) of approximately equal strength and (for fighter aircraft) separated by 100 to 200 milliseconds. When plotted, this pair of shock waves and the expanding flow between them have the appearance of a capital letter "N," so a sonic boom pressure wave is usually called an "N-wave." An N-wave has a characteristic "bang-bang" sound that can be startling. Figure B–7 shows the generation and

evolution of a sonic boom N-wave under the aircraft. Figure B–8 shows the sonic boom pattern for an aircraft in steady supersonic flight. The boom forms a cone that is said to sweep out a "carpet" under the flight track.

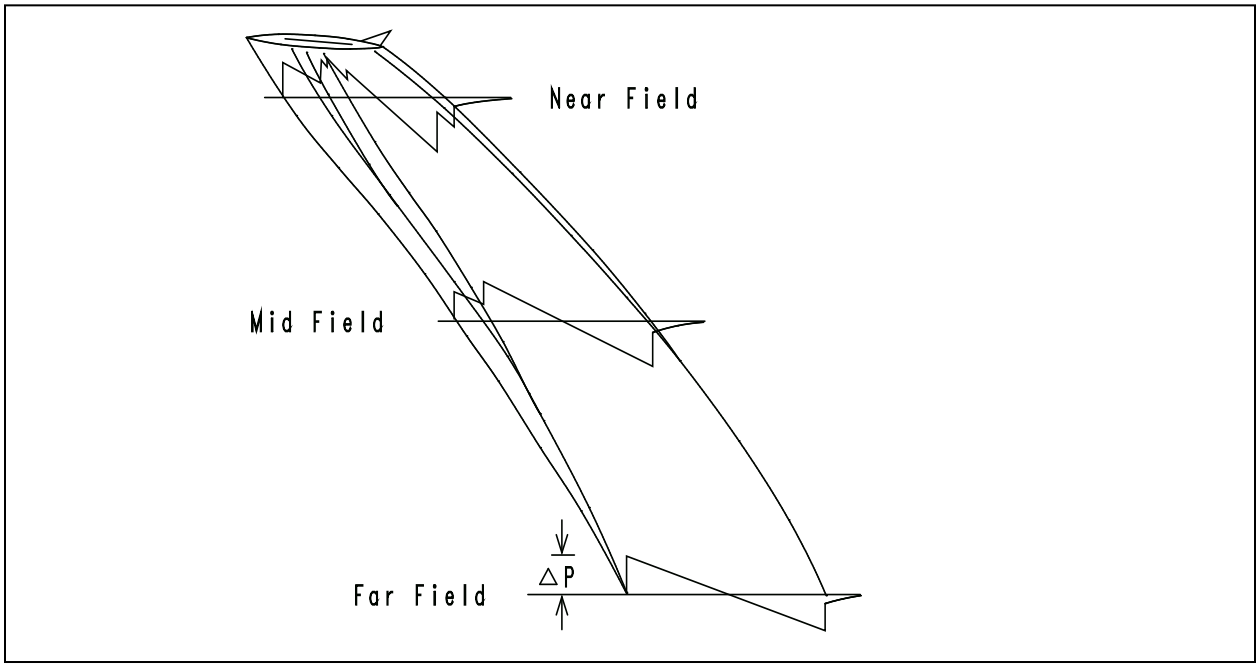


Figure B–7. Sonic Boom Generation and Evolution to N-Wave

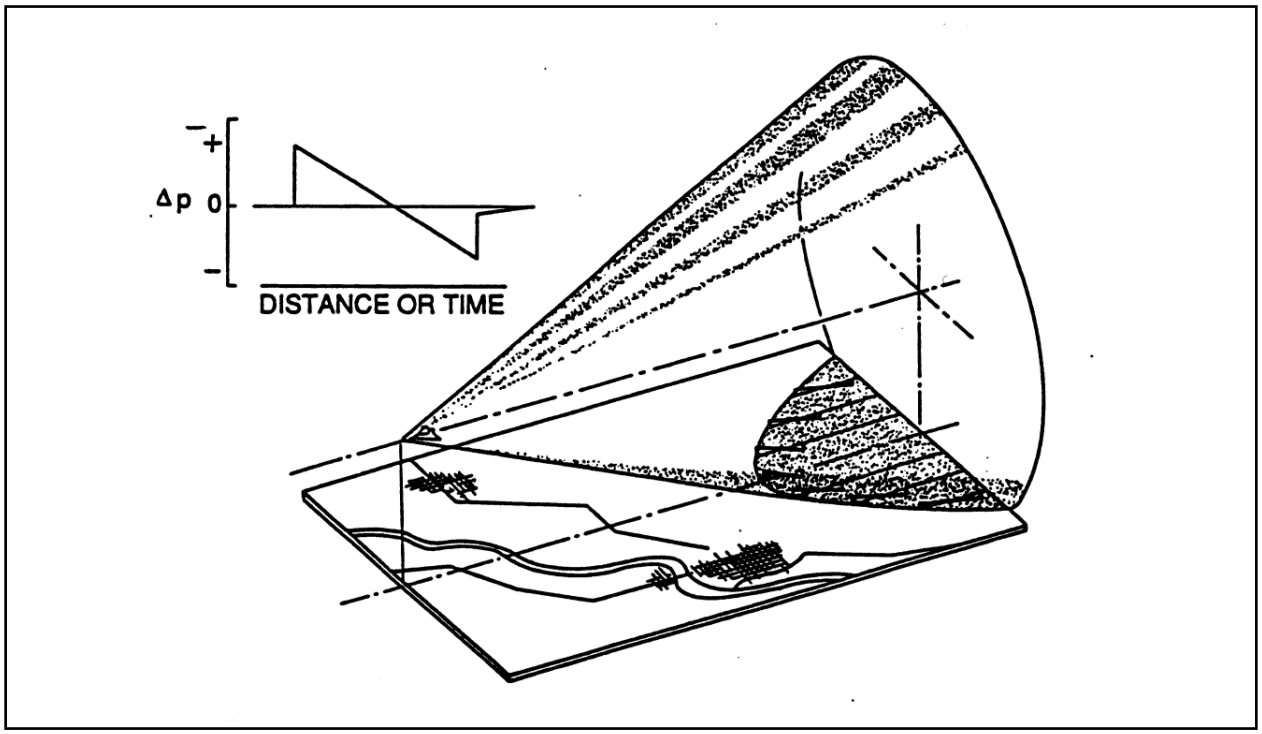


Figure B–8. Sonic Boom Carpet in Steady Flight

The complete ground pattern of a sonic boom depends on the size, shape, speed, and trajectory of the aircraft. Even for a nominally steady mission, the aircraft must accelerate to supersonic speed at the start, decelerate back to subsonic speed at the end, and usually change altitude. Figure B–9 illustrates the complexity of a nominal full mission.

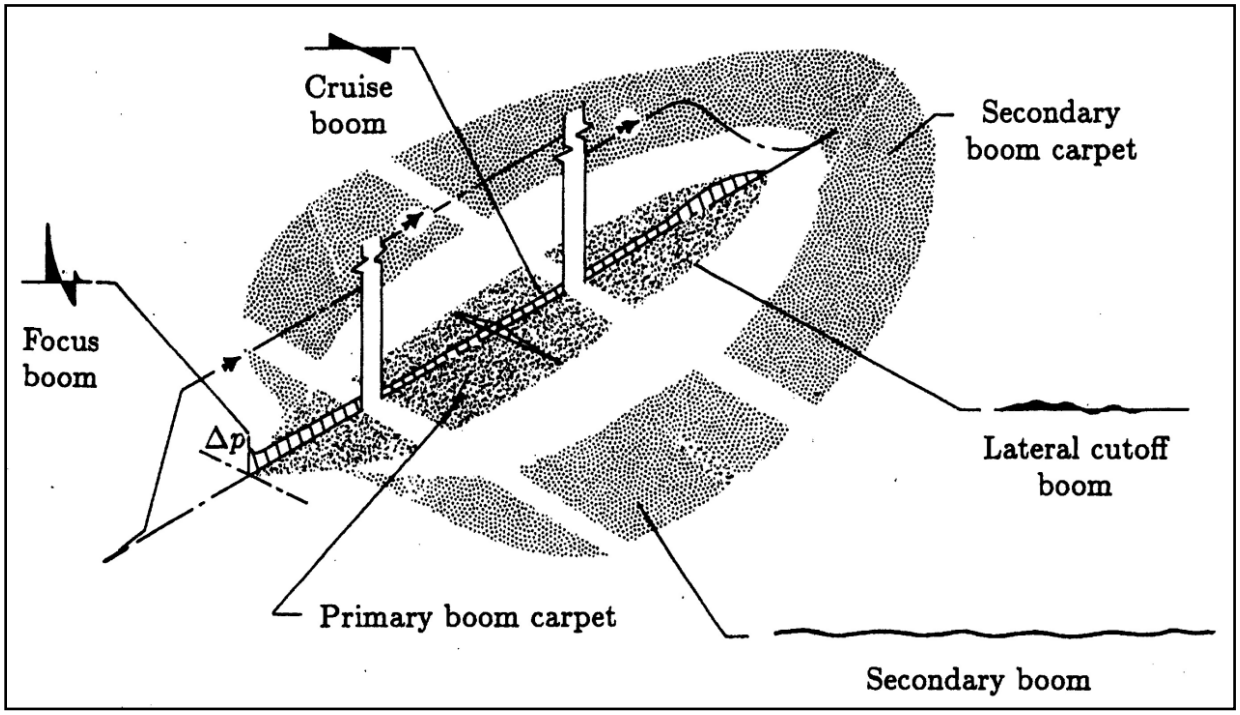


Figure B–9. Complex Sonic Boom Pattern for Full Mission

The Air Force's PCBoom4 computer program (Plotkin and Grandi 2002) can be used to compute the complete sonic boom footprint for a given single event, accounting for details of a particular maneuver.

Supersonic operations for the proposed action and alternatives are, however, associated with air combat training, which cannot be described in the deterministic manner that PCBoom4 requires. Supersonic events occur as aircraft approach an engagement, break at the end, and maneuver for advantage during the engagement. Long time cumulative sonic boom exposure, CDNL, is meaningful for this kind of environment.

Long-term sonic boom measurement projects have been conducted in four supersonic air combat training airspaces: White Sands, New Mexico (Plotkin et al. 1989); the eastern portion of the Goldwater Range, Arizona (Plotkin et al. 1992); the Elgin MOA at Nellis AFB, Nevada (Frampton et al. 1993); and the western portion of the Goldwater Range (Page et al. 1994). These studies included analysis of schedule and air combat maneuvering instrumentation data and supported development of the 1992 BOOMAP model (Plotkin et al. 1992). The current version of BOOMAP (Frampton et al. 1993, Plotkin 1996) incorporates results from all four studies. Because BOOMAP is directly based on long-term measurements, it implicitly accounts for such variables as maneuvers, statistical variations in operations, atmosphere effects, and other factors.

Figure B–10 shows a sample of supersonic flight tracks measured in the air combat training airspace at White Sands (Plotkin et al. 1989). The tracks fall into an elliptical pattern aligned with preferred engagement directions in the airspace. Figure B–11 shows the CDNL contours that were fit to six months of measured booms in that airspace. The subsequent measurement programs refined the fit, and demonstrated that the elliptical maneuver area is related to the size and shape of the airspace (Frampton et al. 1993). BOOMAP quantifies the size and shape of CDNL contours, and also numbers of booms per day, in air combat training airspaces. That model was used for prediction of cumulative sonic boom exposure in this analysis.

Figure B–10. Supersonic Flight Tracks in Supersonic Air Combat Training Airspace

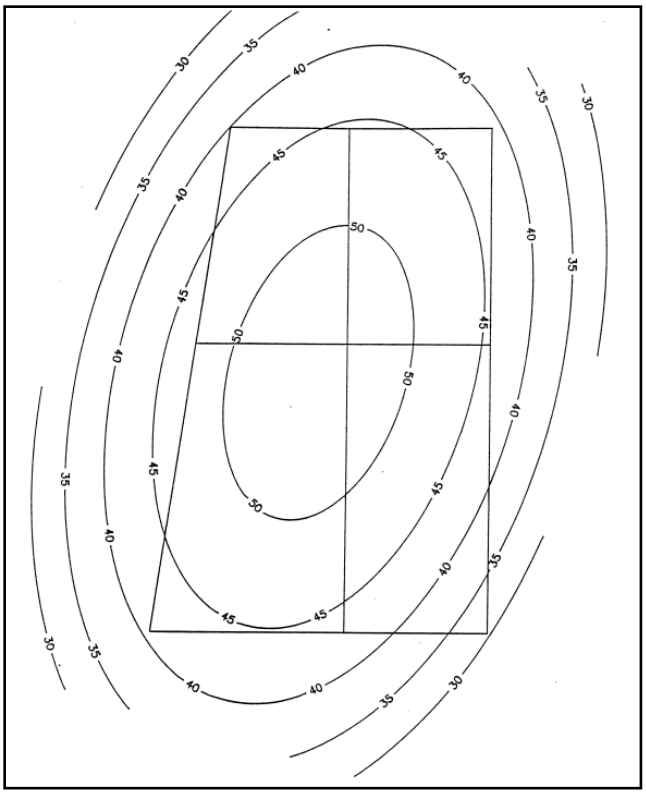


Figure B–11. Elliptical CDNL Contours in Supersonic Air Combat Training Airspace

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Appendix C
Cultural Resources/ Cultural and Natural Consultations

Appendix C. Cultural Resources/ Cultural and Natural Consultations

C.1 Boise AGS Historical Setting

C.1.1 Regional History

Prehistoric occupation of the general area could date to as long ago as 12,000 years before present (Butler 1986), although no sites of that age have been found in the immediate area. Although theorists disagree on the details of the prehistoric cultural history of southwestern Idaho (Gehr et al. 1982; Butler 1986; Meatte 1990), they agree that it is characterized by a slow change through time from small, highly mobile groups to larger, more-complex villages occupied by collectors who occasionally dispersed into foraging groups in some areas for portions of the year. The major discrepancies in the chronologies occur because of disagreements in dates from the earliest occupation of the region and the timing of the Shoshone migration into the area.

At the time of contact with the first European-Americans, the Shoshone, Bannock, and Paiute utilized and occupied the Boise River Valley. The Shoshone and Paiute represent two distinct linguistic populations within the larger Numic language family, which inhabited the high desert country of southwestern Idaho, southeastern Oregon, and northern Nevada.

The Boise Valley was known by a name that may have meant "cottonwood feast valley" or "cottonwood meeting place" (Davis 1990; Witherell 1989), and it was a meeting place for trade and social activity among a diverse group, including the Shoshone, Bannock, Paiute, and Nez Perce. The village located there was known as Awa (Witherell 1989).

There is little mention of Native Americans in the vicinity of Boise City after European-Americans began to settle there. Steward (1938) reports that the Native American population of the Boise River Valley was between 200 and 300 people in the latter half of the 1860s. Today, these groups have settled throughout southern Idaho and northern Nevada, with a concentration in the Duck Valley Reservation on the border of Idaho and Nevada and Fort Hall Reservation near Pocatello, Idaho.

European-Americans entered southwestern Idaho in 1811 when members of Astor's Pacific Fur Company followed the Snake River across Idaho to the west, beginning an era of fur trapping that continued until 1839 (Schwantes 1991). Accounts of the various expeditions suggest that the trappers concentrated most of their efforts near the Snake River and its nearby tributaries. The Hudson Bay Company site of Fort Boise (Old Fort Boise) was established in 1834 at the confluence of the Boise River and the Snake River. By the end of the 1830s, competition among fur companies had resulted in a severe decline in the beaver population and an end to profitable trapping (Hutchison and Jones 1993).

Missionaries followed the trappers' Snake River route west beginning in 1836 (Hutchison and Jones 1993). They were the first of thousands of travelers on what later became known as the Oregon Trail. In southwestern Idaho, the Oregon Trail generally followed the route of the

Snake River, passing about 3 miles to the northwest of the installation. The U.S. Army post of Fort Boise was established in 1863 in the vicinity of the present-day City of Boise to protect miners and travelers on the Oregon Trail (Haines 1981). The southern route of the trail, called the Snake River Alternate, followed the river west to Givens Hot Springs and rejoined the main Oregon Trail just west of Old Fort Boise (Hutchison and Jones 1993). Despite intensive use of the trail, little settlement occurred in southern Idaho until the mining boom of the 1860s.

Discovery of gold in the Boise Basin and in the Owyhee Mountains in the 1860s provided the stimulus for much of the settlement in southwestern Idaho. Mining promoted the growth of the town of Boise as a major urban center along the Oregon Trail. By 1878, the Oregon Short Line railroad across southern Idaho was completed. Cattle and sheep ranching and farming developed in southwestern Idaho, initially to provide food for the mining communities. Most of the ranching and farming operations clustered in the more-fertile, well-watered locations, but the upland plateaus and valleys provided extensive grazing areas.

Irrigated farming in the Middle Snake River Valley became increasingly important as major mining production in the region drew to a close. The first irrigation was diverted to the Boise Valley in 1864. In the following years, water rights were filed for what would become the New York Canal (west of the Boise Air Terminal). Large-scale irrigation was encouraged by advances in technology; however, some of the major private irrigation projects in southwestern Idaho, such as the New York Canal, encountered financial difficulties during the 1880s and the 1890s (Ringert 1986). The canals were taken over by irrigation districts or by the U.S. Bureau of Reclamation after 1902, following the passage of the Reclamation Act. General Land Office records held by the U.S. Bureau of Land Management indicate that homesteads in the vicinity of what is now Boise Air Terminal were patented between 1910 and 1915 (GLO 2002).

In the mid-1930s, Boise's need for additional aviation services prompted the city to seek U.S. Works Progress Administration funds for a new airport (NGB 2000). Efforts succeeded, and the new Boise Air Terminal opened at its current location in 1939 on what was then undeveloped benchland about 4 miles south of the city. The new airport included a combination hangar-terminal and a runway reported to be one of the longest in the world (NGB 2000).

C.1.2 IDANG Installation, Boise Air Terminal (Gowen Field)

In 1940, the City of Boise had its new Boise Air Terminal certified as a property important to national defense so that it could be selected as an Army Air Corps base site (NGB 2000). The airfield was leased to the U.S. War Department in 1941 for use as an Army Air Corps base. The newly constructed airbase was subsequently named Gowen Field in honor of First Lieutenant Paul R. Gowen, a former Caldwell resident, who died in a plane crash in 1938 in Panama (IMHM 2002).

Initially, the base mission was to train crews in the operation of medium bomber aircraft and reconnaissance aircraft for the Second Air Force. In 1942, the mission changed to heavy bombardment groups, and the base began training B-17 "Flying Fortress" pilots (Hart 1991). Gowen Field became a Combat Crew Training School in 1943 and served in that capacity for the

remainder of World War II (NGB 2000). The base converted from B-17s to B-24s in 1943 (Hart 1991).

In 1946, the Idaho National Guard headquarters was transferred to Gowen Field. The newly formed 190th Fighter Squadron (190 FS) was officially assigned to the base, and an ordnance company and warehouse units of the Army National Guard were transferred there (NGB 2000). The 190 FS's first aircraft were F-51 propeller aircraft (NGB 2000). The 190 FS was called to active duty in 1951 for the Korean War and saw combat duty in the war zone. After the Korean War, the 190 FS was assigned to the Western Defense Command and charged with aiding in the air defense of the northwestern United States. In support of this new mission, the 190 FS began flying the F-86A Sabrejet in 1953 (NGB 2000). In 1956, the 124th Jet Fighter Group (124 FG) was activated at Gowen Field and took the redesignated 190 FS as one of its components. When the 190 FS became the flying unit of the 124 FG, the number of authorized personnel nearly doubled, and the squadron began flying the F-89 jet interceptors, capable of extremely long missions (NGB 2000). The 124 FG participated in an Alert Series in 1957, with five pilots responsible to Air Defense Command for 2 months. By 1964, Gowen Field was home to the F-102 Delta Daggers, which were on constant alert from 1964 through 1975 as part of the Vietnam and Cold War efforts.

A new mission of aerial reconnaissance brought the RF-4C Phantom to the base in 1975, and the group was redesignated as the 124th Tactical Reconnaissance Group. In 1991, the unit's first F-4G Wild Weasel arrived at Gowen Field, and the 124th operated the only Wild Weasel school in the U.S. Air Force (Air Force). The mission of the 124th Wing (124 WG) involved F-4 fighter aircraft until the mid-1990s. As F-4 fighter aircraft were being phased out of the U.S. military, the aircraft based at Gowen Field were replaced with A-10 Thunderbolt Close Air Support and C-130 Hercules transport aircraft (Global Security 2002). Currently, the 124th Fighter Wing (124 FW) (renamed as part of the 2005 Base Realignment and Closure decision) has 18 A-10 Primary Aircraft Authorized (PAA).

Tables C–1 through C–4 list the resources related to the National Register of Historic Places (NRHP) for Boise AGS and beneath the Boise AGS primary airspace.

Table C–1. Boise AGS Resources Individually Eligible for the NRHP

Facility Number	*Facility Name*	*Construction Date*	*Idaho Site Inventory Site Number*	*NRHP Status*
307	Headquarters	1941	01-19927	Eligible[1]
1105	Storage Igloo	1941	01-19959	Eligible[1]
1112	Storage Igloo	1941	01-19960	Eligible[1]

[1] Eligible for listing in the NRHP, but not listed.

Table C–2. Resources in the Boise AGS World War II Officers' Quarters Historic District

Facility Number	*Facility Name*	*Construction Date*	*Idaho Site Inventory Site Number*	*NRHP Status*
701	Officers' Quarters	1941	01-19942	Contributing
702	Officers' Quarters	1941	01-19943	Contributing
703	Officers' Quarters	1941	01-19944	Contributing
704	Officers' Club	1941	01-19945	Contributing
705	Officers' Club	1941	01-19945	Contributing
706	Officers' Quarters	1941	01-19946	Contributing
707	Officers' Quarters	1941	01-19947	Contributing
708	Officers' Quarters	1941	01-19947	Contributing
709	Officers' Quarters	1941	01-19949	Contributing
710	Officers' Club	1941	01-19945	Contributing
711	Officers' Quarters	1941	01-19950	Contributing
712	Officers' Mess Hall	1941	01-19951	Contributing
713	Officers' Quarters	1941	01-19952	Contributing
714	Officers' Quarters	1941	01-19953	Contributing

Table C–3. Resources in the Boise AGS World War II Enlisted Men's Barracks Historic District

Facility Number	*Facility Name*	*Construction Date*	*Idaho Site Inventory Site Number*	*NRHP Status*
201	Enlisted Men's Barracks	1941	01-20087	Contributing
202	Enlisted Men's Barracks	1941	01-19895	Contributing
203	Warehouse	ca 1980	Not Applicable	Non-Contributing
204	Enlisted Men's Barracks	1941	01-19896	Contributing
205	Enlisted Men's Barracks	1941	01-19897	Contributing
206	Enlisted Men's Mess Hall	1941	01-19898	Contributing
207	Enlisted Men's Barracks	1941		Contributing
208	Enlisted Men's Barracks	1941		Contributing
209	Enlisted Men's Mess Hall	1941	01-19899	Contributing
210	Enlisted Men's Barracks	1941	01-19900	Contributing
211	Enlisted Men's Barracks	1941	01-19901	Contributing
212	Enlisted Men's Barracks	1941	01-19902	Contributing
213	Enlisted Men's Barracks	1941	01-19903	Contributing
214	Enlisted Men's Barracks	1941	01-19904	Contributing
215	Enlisted Men's Mess Hall	1941	01-19905	Contributing
216	Enlisted Men's Barracks	1941	01-19906	Contributing
217	Enlisted Men's Barracks	1941	01-19907	Contributing
218	Enlisted Men's Barracks	1941		Contributing
219	Enlisted Men's Barracks	1941	01-19908	Contributing

Table C–4. NRHP-Listed Resources Under Boise AGS Airspace

Airspace	*State*	*County*	*Property*	*Location*
Jarbidge MOA	Nevada	Elko	Gold Creek Ranger Station	Mountain City
Jarbidge MOA	Idaho	Owyhee	Wickahoney Post Office and Stage Station	Wickahoney
Saddle A MOA	Oregon	Malheur	Sheep Ranch Fortified House	Arock
Saddle A MOA	Oregon	Malheur	Birch Creek Ranch Historic Rural Landscape[1]	Jordan Valley
Paradise MOA	Nevada	Humboldt	Silver State Flour Mill	Paradise Valley
IR-301	Idaho	Custer	Hosford, Emmett, House	Challis
IR-301	Idaho	Custer	Bux's Place	Challis
IR-301	Idaho	Custer	Custer County Jail	Challis
IR-301	Idaho	Custer	Building at 247 Pleasant Avenue	Challis
IR-301	Idaho	Custer	Wilkinson, Clyde, House	Challis
IR-301	Idaho	Custer	Rowles, Donaldson, House	Challis
IR-301	Idaho	Custer	False-Front Commercial Building	Challis
IR-301	Idaho	Custer	Chivers, Bill, House	Challis
IR-301	Idaho	Custer	Stone Building	Challis
IR-301	Idaho	Custer	Twin Peaks Sports	Challis
IR-301	Idaho	Custer	Buster Meat Market	Challis
IR-301	Idaho	Custer	Board-and-Batten Commercial Building	Challis
IR-301	Idaho	Custer	Challis Cold Storage	Challis
IR-301	Idaho	Custer	Penwell House	Challis
IR-301	Idaho	Custer	Peck, Bill, House	Challis
IR-301	Idaho	Custer	Challis Brewery Historic District	Challis
IR-301	Idaho	Custer	I.O.O.F. Hall	Challis
IR-301	Idaho	Custer	Chivers, Thomas, House	Challis
IR-301	Idaho	Custer	Challis High School	Challis
IR-301	Idaho	Custer	Old Challis Historic District	Challis
IR-301	Idaho	Custer	Smith, Henry, House	Challis
IR-301	Idaho	Custer	McKendrick House	Challis
IR-301	Idaho	Custer	Bayhorse	Challis
IR-301	Idaho	Custer	Stone and Log Building	Challis
IR-301	Idaho	Custer	Chivers, Thomas, Cellar	Challis
IR-301	Idaho	Lemhi	Charcoal Kilns	Leadore
IR-301	Idaho	Washington	Edwards–Gillette Barn	Cambridge
IR-301	Idaho	Washington	Wilson House	Cambridge
IR-301	Idaho	Washington	Salubria Lodge No. 31	Cambridge
IR-301	Montana	Beaverhead	Bannack Historic District	Dillon
IR-301	Montana	Beaverhead	Big Hole National Battlefield	Wisdom
IR-301	Montana	Ravalli	Alta Ranger Station	Conner
IR-302	Idaho	Butte	Goodale's Cutoff	Arco
IR-302	Idaho	Camas	Skillern, John, House	Fairfield
IR-302, Paradise MOA	Idaho	Owyhee	Camp Three Forks	Silver City
VR-316	Oregon	Harney	Allison Ranger Station	Burns
VR-316	Oregon	Harney	French, Pete, Round Barn	Burns
VR-316	Oregon	Malheur	Birch Creek Ranch Historic Rural Landscape[1]	Jordan Valley

[1] Property underlies multiple airspaces.

Key: IR=Instrument Route; MOA=Military Operations Area; VR=Visual Route.

Source: NRIS 2010.

C.2 Holloman AFB Historical Setting

Humans have inhabited the area near Holloman Air Force Base (Holloman AFB) for at least 12,000 years. The climate of the American Southwest was once cooler and moister, supporting megafauna such as mammoth, musk ox, giant beaver, mastodon, and sloth. The first inhabitants of the area, termed Paleo Indians, were big-game hunters who relied on megafauna until their extinction approximately 10,000 years before the present (BP). They are best known through the artifacts left behind, principally projectile points (e.g., Clovis and Folsom spear points).

Later, during the Archaic Period (approximately 8,000 to 2,800 years BP), the climate gradually became warmer and drier, and forests gave way to desert scrub and grassland. By the middle of the period, vegetation in the area largely resembled the conditions of today. Populations continued to rely on hunting but developed diverse technologies and used a greater variety of plant resources, as evidenced by an increased variety of flaked and ground stone tools.

After the Archaic Period and until about 1,000 years ago, groups became increasingly less mobile and dramatically increased their reliance on agriculture, particularly maize production. People of this time developed sophisticated irrigation technologies, fine and elaborately decorated ceramics, long-distance trade, solar calendars, and social and political systems to manage the higher population densities that are possible with a successful agriculture-based economy. Large multi-room pueblos were constructed, perhaps housing as many as 1,000 people (Fagan 1991). Toward the end of the thirteenth century *Anno Domini* (A.D.), a major drought occurred throughout the Southwest. When agriculture failed and populations naturally reduced through attrition, groups relocated to environments that could support them (Holloman AFB 2005).

Spanish explorers entered the region beginning in the mid-1500s, encountering Apache resistance. Apache occupation continued until the mid-1700s, when the Comanche entered the region and engaged in raids against eastern Pueblo and Spanish settlements that led to military campaigns by the Spanish. In 1810, a treaty between the Spanish and the Mescalero Apache established a reservation for the Mescalero.

After the war between the United States and Mexico in 1846, most of New Mexico and Arizona were ceded to the United States. The Texas/New Mexico borders were established in 1850. American military forts were established by the early 1860s to defend routes of travel through the region. Most settlement occurred after 1882 and the arrival of the Southern Pacific Railroad. Ranching, which began in the late 1800s, continued to be important into the 1900s. Mining began in the nearby San Andres, Oscura, Mockingbird, and Jicarilla Mountains during the 1870s, spurring local settlement and the development of water control systems (Holloman AFB 2005).

Alamogordo Army Air Field (later renamed Holloman AFB) was created in 1942 to serve as a center for the British Overseas Training Program, where aircrews would train over the uninhabited expanses of New Mexico (Holloman AFB 2010). With the December 7, 1941, attack on Pearl Harbor, Britain decided not to pursue its overseas training program. The United States elected to establish a base at the same location to train its own growing military. For the remainder of World War II, the base served as the training grounds for B-17, B-24, and B-29 bomber crews.

After World War II, the base was renamed Holloman Air Force Base and, along with the adjacent White Sands Proving Ground, became the primary testing area for pilotless aircraft, guided missiles, and other research programs (Holloman AFB 2010).

Through the 1950s and 1960s, Holloman AFB/White Sands Proving Ground was the location of several significant developments in aviation technologies. In 1952, two Philippine monkeys rode an Aerobee rocket to an altitude of 36 miles, reaching a speed of 2,000 miles per hour. The primates were recovered unharmed and provided significant data later applied to manned space missions (NMUSAF 2007). In 1954, Lieutenant Colonel John Stapp rode a rocket sled to a speed of 632 miles per hour, setting a land speed record. In 1960, in an attempt to evaluate techniques for high-altitude bailout, Captain Joseph Kittinger jumped from a balloon at a height of more than 102,000 feet. During the 13-minute free fall, he reached a speed of 614 miles per hour and broke four world records. Holloman also made significant contributions to aerospace technologies. In 1961, a chimpanzee trained at Holloman was the first specimen successfully launched into orbit (Holloman AFB 2005).

In 1968, Holloman AFB became the home of the 49th Tactical Fighter Wing (49 TFW) employing the F-4 Phantom. In 1971, Holloman AFB became part of the Tactical Air Command, and shifted from missile testing to fighter pilot training. In 1972, the 49 TFW transitioned to the F-15 Eagle, the Air Force's top air-to-air weapon (Global Security 2006). In 1992, the base became part of Air Combat Command as the 49 TFW transitioned aircraft once again. The base is now home to arguably the most advanced fighter aircraft ever produced, the F-117A Nighthawk, or Stealth Fighter (Holloman AFB 2005). The most recent development at Holloman AFB is the establishment of the German Air Force Tactical Training Center. Currently, more than 300 German Air Force members are assigned to the base in the only program like it in the country.

Today, Holloman AFB supports approximately 21,000 active-duty, guard, reserve, and retired military personnel and U.S. Department of Defense civilians and their family members. Personnel from Holloman AFB have participated in Operation Desert Shield/Desert Storm, Operation Allied Forces, Operation Southern Watch, Operation Northern Watch, Operation Enduring Freedom, and many more. Holloman AFB personnel also assist the White Sands Missile Range (WSMR) in maintaining the White Sands Space Harbor, an alternative runway for Space Shuttle missions (Holloman AFB 2005).

Tables C–5 through C–7 list the recommended eligibility evaluations for properties at Holloman AFB. Table C–8 lists the NRHP-listed properties under the Holloman AFB primary airspace. Properties must be at least 50 years old and are evaluated based on seven aspects of integrity and four main criteria. According to the Advisory Council on Historic Preservation *National Register Evaluation Criteria* (ACHP 2008):

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Some cultural resources may be evaluated under special criteria considerations. "Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within" specific categories (ACHP 2008). Criteria Consideration G covers properties less than 50 years old if they are of exceptional importance.

Table C–5. Holloman AFB NRHP-Eligible and Potentially Eligible Pre-Military Ranching and Agriculture Architectural Resources

Site Number	*Site Name*	*NRHP Eligibility Recommendation*
HAR-008	Jewell-Danley Homestead	Potentially eligible
HAR-042	Osie Danley Ranch	Potentially eligible
HAR-012	C. C. McNatt “Old Home Place”/Owl Well	Potentially eligible
HAR-047	McNatt Ranch Headquarters	Potentially eligible
HAR-049	West Well	Potentially eligible
HAR-034	Fred Bradford Place	Eligible
HAR-057	Fairchild Well	Potentially eligible
HAR-019	James McKillip Farm	Potentially eligible
HAR-051	Luther Boles Farm	Potentially eligible
HAR-053	Groom Residence	Potentially eligible
HAR-054	Reynolds Dairy	Potentially eligible
HAR-061	Charles Redie Homestead	Potentially eligible
LA 103410	Hyde Farm	Potentially eligible
HAR-014	Virginia Homestead Entry	Potentially eligible
HAR-045	Not Applicable	Potentially eligible
HAR-052	Well D	Potentially eligible
HAR-055	Arthur Blair Homestead	Potentially eligible
HAR-063	Lightfoot Well	Potentially eligible
HAR-065	Not Applicable	Potentially eligible

Table C–6. Holloman AFB World War II Era NRHP-Eligible Buildings

Facility No.	*Construction Date*	*Facility Name*	*NRHP Eligibility Recommendation*
0	1943	JEEP TARGET	Eligible (C)
301	1944	MAINT DOCK, S/A	Eligible (C)
1079	1943	MAINT DOCK, S/A	Eligible (C)

Table C–7. Holloman AFB Cold War Era NRHP-Eligible Buildings

Facility No.	*Construction Date*	*Facility Name*	*NRHP Criteria*	*Historical Use*	*Common Name*
NA	1947	JB-2 Ramp	A, C		JB-2 Ramp
NA	1955	Test Stand	A, C		MTSA
NA	1950	INCINERATOR	A	Fuel incinerator	
850	1953	SC LAB Geophysical	A	Electronics and Atmosphere	
900	1954	TWR, NAVAID	A, C, G, poss. B	Missile Theodolite Tower	Mart Site
1102	1952	MSL RDR STN	A, C	Radar Triangulation Building	King-1
1113	1949	RAD RELAY FCLTY	A, C, G		MTSA
1116	1949	MWR SUP/NAF C-STOR	A, C, G	Blockhouse	NATIV Blockhouse
1127	1955	MWR SUP/NAF C-STOR	A, G	Missile Assembly Building	MTSA
1133	1954	MSL THOLIT STN	A, C, G, poss. B	Missile Theodolite Tower	Pritch Site
1139	1951	MWR SUP/NAF C-STOR	A, C, G	Blockhouse	GAPA Blockhouse (MTSA)
1142	1950	EXCH, RETAIL WHSE	A, C, G	Blockhouse	Aerobee Blockhouse Zel Site
1159	1957	RSCH EQUIP STOR	A, C	Horizontal Test Stand	High-Speed Test Track
1160	1957	MSL/SPACE RSCH TST	A, C	Horizontal Test Stand	High-Speed Test Track
1161	1957	TST TRACK BLDG	A, C	Track Control	Midway
1162	1957	TST TRACK BLDG	A, C	Blockhouse	Bravo
1163	1957	TST TRACK BLDG	A, C	Blockhouse	Coco
1175	1949	TST TRACK BLDG	A, C	Blockhouse	Alpha
1201	1951	SC LAB MED	A, C	Aero Med Field Lab	
1202	1953	SC LAB MED	A, C	SC Lab Medical/Aero Med	
1249	1954	MSL THODLIT STN	A, C, G, poss. B		Sole Site
1264	1957	SC LAB MED	A, C	Missile Assembly Building	
1284	1948	MSL INSTM STN	A, C, G	Missile Instrumentation Station	Tula Peak
1440	1962	MSL LCH FCLTY	A, G, poss. C	Missile Launching Facility	Able 51
1442	1959	MSL LCH FCLTY	A, C, G	Missile Launching Facility	ZEL Launcher at Able51/ Zel Site

Table C–8. NRHP-Listed Resources Under Holloman AFB Airspace

Airspace	*State*	*County*	*Property*	*Location*
Ancho ATCAA	New Mexico	Chaves	CA Bar Ranch[2]	Mayhill
Ancho ATCAA	New Mexico	Chaves	Flying H Ranch[1]	Roswell
Ancho ATCAA	New Mexico	Lincoln	Carrizozo Woman's Club[1]	Carrizozo
Ancho ATCAA	New Mexico	Lincoln	Paden's Drug Store[1]	Carrizozo
Ancho ATCAA	New Mexico	Lincoln	Aguayo Family Homestead[1]	Nogal
Ancho ATCAA	New Mexico	Lincoln	Hopeful Lode[1]	Nogal
Ancho ATCAA	New Mexico	Lincoln	White Oaks Historic District[1]	White Oaks
Ancho ATCAA	New Mexico	Otero	Infirmary Building[1]	Alamogordo
Ancho ATCAA	New Mexico	Otero	Central Receiving Building[1]	Alamogordo
Ancho ATCAA	New Mexico	Otero	Auditorium and Recreation Building[1]	Alamogordo
Ancho ATCAA	New Mexico	Otero	Administration Building[1]	Alamogordo
Ancho ATCAA	New Mexico	Otero	Alamogordo Woman's Club[1]	Alamogordo
Ancho ATCAA	New Mexico	Otero	U.S. Post Office—Alamogordo[1]	Alamogordo
Ancho ATCAA	New Mexico	Otero	Jackson House[1]	Alamogordo
Ancho ATCAA	New Mexico	Otero	Mexican Canyon Trestle[1]	Cloudcroft
Ancho ATCAA	New Mexico	Otero	La Luz Historic District[1]	La Luz
Ancho ATCAA	New Mexico	Otero	La Luz Pottery Factory[1]	La Luz
Ancho ATCAA	New Mexico	Otero	Carrisa Lookout Complex[1]	Long Canyon
Ancho ATCAA	New Mexico	Otero	Mayhill Administrative Site[1]	Mayhill
Ancho ATCAA	New Mexico	Otero	St. Joseph Apache Mission Church[1]	Mescalero
Ancho ATCAA	New Mexico	Otero	Weed Lookout Tower[1]	Sacramento
Ancho ATCAA	New Mexico	Otero	Tularosa Original Townsite District[1]	Tularosa
Ancho ATCAA	New Mexico	Otero	Bluewater Lookout Complex[2]	Weed
Cato MOA	New Mexico	Catron	El Caso Lookout Complex	El Caso Lake
Cato MOA	New Mexico	Catron	Mangas Mountain Lookout Complex	Mangas
Cato MOA	New Mexico	Socorro	Hall Hotel	Magdalena
Cato MOA	New Mexico	Socorro	Main Street Commercial Building	Magdalena
Cato MOA	New Mexico	Socorro	Salome Store	Magdalena
Cato MOA	New Mexico	Socorro	Aragon House	Magdalena
Cato MOA	New Mexico	Socorro	MacTavish House	Magdalena
Cato MOA	New Mexico	Socorro	Gutierrez House	Magdalena
Cato MOA	New Mexico	Socorro	Bank of Magdalena	Magdalena
Cato MOA	New Mexico	Socorro	Magdaline House	Magdalena
Cato MOA	New Mexico	Socorro	Salome Warehouse	Magdalena
Cato MOA	New Mexico	Socorro	Lewellen House	Magdalena
Cato MOA	New Mexico	Socorro	Ilfeld Warehouse	Magdalena
Cato MOA	New Mexico	Socorro	Hilton House	Magdalena
Cato MOA	New Mexico	Socorro	MacDonald Merchandise Building	Magdalena
Cato MOA	New Mexico	Socorro	Atchison, Topeka and Santa Fe Railway Depot	Magdalena
Cowboy ATCAA	New Mexico	Chaves	CA Bar Ranch[2]	Mayhill
Cowboy ATCAA	New Mexico	Chaves	Flying H Ranch[1]	Roswell
Cowboy ATCAA	New Mexico	Lincoln	Fort Stanton[4]	Capitan
Cowboy ATCAA	New Mexico	Lincoln	Fort Stanton Historic District (Boundary Increase)[4]	Capitan
Cowboy ATCAA	New Mexico	Lincoln	Paden's Drug Store[1]	Carrizozo
Cowboy ATCAA	New Mexico	Lincoln	Carrizozo Woman's Club[1]	Carrizozo

Airspace	*State*	*County*	*Property*	*Location*
Cowboy ATCAA	New Mexico	Lincoln	Jicarilla Schoolhouse[3]	Jicarilla
Cowboy ATCAA	New Mexico	Lincoln	Lincoln Historic District[4]	Lincoln
Cowboy ATCAA	New Mexico	Lincoln	Aguayo Family Homestead[1]	Nogal
Cowboy ATCAA	New Mexico	Lincoln	Hopeful Lode[1]	Nogal
Cowboy ATCAA	New Mexico	Lincoln	El Paso And Southwestern Railway Water Supply System[4]	Nogal
Cowboy ATCAA	New Mexico	Lincoln	Ruidoso Lookout Tower[4]	Ruidoso
Cowboy ATCAA	New Mexico	Lincoln	New Mexico Military Institute Summer Camp, Main Building[4]	Ruidoso
Cowboy ATCAA	New Mexico	Lincoln	Monjeau Lookout[4]	Villa Madonna
Cowboy ATCAA	New Mexico	Lincoln	White Oaks Historic District[1]	White Oaks
Cowboy ATCAA	New Mexico	Otero	Infirmary Building[1]	Alamogordo
Cowboy ATCAA	New Mexico	Otero	Central Receiving Building[1]	Alamogordo
Cowboy ATCAA	New Mexico	Otero	Auditorium and Recreation Building[1]	Alamogordo
Cowboy ATCAA	New Mexico	Otero	Administration Building[1]	Alamogordo
Cowboy ATCAA	New Mexico	Otero	Alamogordo Woman's Club[1]	Alamogordo
Cowboy ATCAA	New Mexico	Otero	US Post Office—Alamogordo[1]	Alamogordo
Cowboy ATCAA	New Mexico	Otero	Jackson House[1]	Alamogordo
Cowboy ATCAA	New Mexico	Otero	Mexican Canyon Trestle[1]	Cloudcroft
Cowboy ATCAA	New Mexico	Otero	La Luz Pottery Factory[1]	La Luz
Cowboy ATCAA	New Mexico	Otero	La Luz Historic District[1]	La Luz
Cowboy ATCAA	New Mexico	Otero	Carrisa Lookout Complex[1]	Long Canyon
Cowboy ATCAA	New Mexico	Otero	Mayhill Administrative Site[1]	Mayhill
Cowboy ATCAA	New Mexico	Otero	St. Joseph Apache Mission Church[1]	Mescalero
Cowboy ATCAA	New Mexico	Otero	Weed Lookout Tower[1]	Sacramento
Cowboy ATCAA	New Mexico	Otero	Tularosa Original Townsite District[1]	Tularosa
Cowboy ATCAA	New Mexico	Otero	Bluewater Lookout Complex[2]	Weed
IR-133	New Mexico	Socorro	Salinas Pueblo Missions National Monument[5]	Gran Quivira
IR-133	New Mexico	Torrance	Mountainair Municipal Auditorium	Mountainair
IR-133	New Mexico	Torrance	Shaffer Hotel	Mountainair
IR-133	New Mexico	Torrance	Rancho Bonito	Mountainair
IR-133	New Mexico	Torrance	Salinas Pueblo Missions National Monument[5]	Quarai/Punta de Agua
IR-133	New Mexico	Torrance	Salinas Pueblo Missions National Monument[5]	Abo
IR-134	New Mexico	Chaves	CA Bar Ranch[2]	Mayhill
IR-134	New Mexico	Otero	Bluewater Lookout Complex[2]	Weed
IR-134	New Mexico	Eddy	Ring Midden Sites of the Guadalupe Mountains MPS, Archaeological Site No. AR 03-08-03-195	Queen
IR-134	New Mexico	Eddy	Ring Midden Sites of the Guadalupe Mountains MPS, Archaeological Site No. AR 03-08-03-232	Queen
IR-134	New Mexico	Eddy	Dark Canyon Apache Rancheria–Military Battle Site	Queen
IR-134	New Mexico	Eddy	Last Chance Canyon Apache–Cavalry Battle Site	Queen
IR-192/194	New Mexico	Chaves	CA Bar Ranch[2]	Mayhill
IR-192/194	New Mexico	Otero	Wofford Lookout Complex	Cloudcroft

Airspace	*State*	*County*	*Property*	*Location*
IR-192/194	New Mexico	Otero	Bluewater Lookout Complex[2]	Weed
Beak A MOA	New Mexico	Lincoln	Jicarilla Schoolhouse[3]	Jicarilla
Beak B MOA	New Mexico	Lincoln	Fort Stanton Historic District (Boundary Increase)[4]	Capitan
Beak B MOA	New Mexico	Lincoln	Fort Stanton[4]	Capitan
Beak B MOA	New Mexico	Lincoln	Lincoln Historic District[4]	Lincoln
Beak B MOA	New Mexico	Lincoln	El Paso And Southwestern Railway Water Supply System[4]	Nogal
Beak B MOA	New Mexico	Lincoln	Ruidoso Lookout Tower[4]	Ruidoso
Beak B MOA	New Mexico	Lincoln	New Mexico Military Institute Summer Camp, Main Building[4]	Ruidoso
Beak B MOA	New Mexico	Lincoln	Monjeau Lookout[4]	Villa Madonna
Talon MOAs	New Mexico	Eddy	Abo Elementary School and Fallout Shelter	Artesia
Talon MOAs	New Mexico	Eddy	Lukins, F. L., House	Artesia
Talon MOAs	New Mexico	Eddy	Moore-Ward Cobblestone House	Artesia
Talon MOAs	New Mexico	Eddy	Ross, Dr. Robert M., House	Artesia
Talon MOAs	New Mexico	Eddy	Hodges-Sipple House	Artesia
Talon MOAs	New Mexico	Eddy	Gesler, Edward R., House	Artesia
Talon MOAs	New Mexico	Eddy	Mauldin-Hall House	Artesia
Talon MOAs	New Mexico	Eddy	Baskin, William, House	Artesia
Talon MOAs	New Mexico	Eddy	Acord, John, House	Artesia
Talon MOAs	New Mexico	Eddy	Robert, Sallie Chisum, House	Artesia
Talon MOAs	New Mexico	Eddy	Atkeson, Willie D., House	Artesia
Talon MOAs	New Mexico	Eddy	Baskin Building	Artesia
Talon MOAs	New Mexico	Eddy	Hodges-Runyan-Brainard House	Artesia
Talon MOAs	New Mexico	Eddy	First National Bank of Eddy	Carlsbad
Talon MOAs	New Mexico	Eddy	Tansill, Rober Weems and Mary E., House	Carlsbad
Talon MOAs	New Mexico	Eddy	Picnic Shelter–Sitting Bull Falls Recreation Area[6]	Carlsbad
Talon MOAs	New Mexico	Eddy	Group Picnic Shelter–Sitting Bull Falls Recreation Area[6]	Carlsbad
Talon MOAs	New Mexico	Eddy	Dam–Sitting Bull Falls Recreation Area[6]	Carlsbad
Talon MOAs	New Mexico	Eddy	Group Picnic Shelter–Sitting Bull Falls Recreation Area[6]	Carlsbad
Talon MOAs	New Mexico	Eddy	Picnic Shelter–Sitting Bull Falls Recreation Area[6]	Carlsbad
Talon MOAs	New Mexico	Eddy	Dam–Sitting Bull Falls Recreation Area[6]	Carlsbad
Pecos MOA	New Mexico	De Baca	Fort Sumner Community House	Fort Sumner
Pecos MOA	New Mexico	De Baca	De Baca County Courthouse	Fort Sumner
Pecos MOA	New Mexico	De Baca	Fort Sumner Railroad Bridge	Fort Sumner
Pecos MOA	New Mexico	De Baca	Fort Sumner Railroad Bridge	Fort Sumner
R5103C/D (McGregor-Fort Bliss)	New Mexico	Otero	Circle Cross Ranch Headquarters	Sacramento
R5103C/D (McGregor-Fort Bliss)	New Mexico	Otero	Archaeological Site No. AR-03-08-02-409	Timberon

Airspace	*State*	*County*	*Property*	*Location*
R-5103C/D (McGregor-Fort Bliss)	New Mexico	Otero	Archaeological Site No. AR-03-08-02-415	Timberon
R-5107 (Lava West)	New Mexico	Bernalillo	Monte Vista and College View Historic District[7]	Albuquerque
R-5107 (Lava West)	New Mexico	Socorro	Trinity Site[7]	Bingham
R-5107 (Mesa East)	New Mexico	Torrance/ Socorro	Salinas Pueblo Missions National Monument[5]	Gran Quivira
R-5107B	New Mexico	Bernalillo	Monte Vista and College View Historic District[7]	Albuquerque
R-5107B	New Mexico	Dona Ana	Bentley, L. B., General Merchandise	Organ
R-5107B	New Mexico	Dona Ana	Launch Complex[3]	White Sands Missile Range
R-5107B	New Mexico	Otero	White Sands National Monument Historic District[8]	Alamogordo
R-5107B	New Mexico	Socorro	Trinity Site[7]	Bingham
R-5107D	New Mexico	Otero	White Sands National Monument Historic District[8]	Alamogordo
R-5107H	New Mexico	Torrance/ Socorro	Salinas Pueblo Missions National Monument[5]	Gran Quivira

[1] Property underlies Ancho ATCAA and Cowboy ATCAA.
[2] Property underlies Ancho ATCAA, Cowboy ATCAA, and IR-192/194.
[3] Property underlies Cowboy ATCAA and MOA US 01058 Beak A MOA, NM.
[4] Property underlies Cowboy ATCAA and MOA US 01060 Beak B MOA, NM.
[5] Property underlies Mesa East, R-5107H, and IR-133/142.
[6] Property underlies MOA US 02152 Talon West High MOA, NM and MOA US 02153 Talon Low MOA, NM.
[7] Property underlies R-5107B and Lava West.
[8] Property underlies R-5107B and R-5107D.
Key: ATCAA=Air Traffic Control Assigned Airspace; MPS=Multiple Property Submission; R=Restricted Area.
Source: NRIS 2010.

C.3 Luke AFB Historical Setting

By about 12,000 BP, people of the Paleoindian traditions were occupying west–central Arizona, although some scholars believe people might have been in the area as early as 30,000 BP. Big-game hunters of the Clovis and Folsom traditions left artifact scatters that include distinctive projectile points and bones of their prey, including mammoth and bison. To the west, the sites left by people of the San Dieguito tradition include cleared areas, rock rings and alignments, trails, and lithic scatters (Air Force 2009).

Between the Paleoindian Period and the development of agriculture and sophisticated ceramics, hunter-gatherers of the Amargosa and Cochise Archaic traditions occupied west–central Arizona. They lived in pit houses and U-shaped windbreaks; other site types include lithic scatters, rock features, trails, and rock art. Their distinctive artifacts include small projectile points and rare ceramics. In some areas, these groups may have had some form of agriculture, while in others, the Archaic tradition may have persisted into the nineteenth century (Air Force 2009). Archaeological sites dating to both the Amargosa and Cochise Archaic traditions have been found under Luke AFB airspace (Tagg and Heilen 2009).

The Hohokam and Patayan people both practiced agriculture and are associated with strong ceramic traditions. Both occupied portions of central Arizona following the bulk of the Archaic Period. The Hohokam lived in permanent settlements in the Salt and Gila River basins. They had sophisticated ceramics, built platform mounds, and practiced agriculture. The Patayan appeared along the Lower Colorado River around A.D. 700, and continued into the Ethnographic Period. They also created ceramics, and their agricultural practices included the use of floodwaters. Cultural remains of the Hohokam and Patayan have been reported in the vicinity of Luke Air Force Base (Luke AFB). Also, Patayan archaeological sites have been found on Barry M. Goldwater Range (BMGR) beneath the Luke AFB airspace (Tagg and Heilen 2009).

There are documented interactions between early Spanish explorers and O'odham Native Americans in the 1690s on what would become the BMGR beneath the Luke AFB airspace (Tagg and Heilen 2009). The Tohono O'odham were eventually forced onto reservation lands, some of which are under the Luke AFB airspace in Arizona. The Western Yavapai probably occupied the Luke AFB area at the time of European contact, although no permanent habitation sites have been located on or near Luke AFB.

Early Spanish explorers occasionally traversed the land under Luke's airspace and attempts were made to establish roads in the area, although they never traveled through the vicinity of the base, nor did later Mexican settlers occupy the immediate area (Tagg and Heilen 2009). The discovery of gold to the east spurred settlement, both for the purpose of mining as well as ranching and farming. Railroads aided the distribution of goods and contributed to the development of the cotton industry (Air Force 2009).

An early aviation tradition in the Phoenix area blossomed with the creation of two military airports. The Phoenix Military Airport became Luke Field, while the Mesa Military Airport became Williams Field. Luke Field was a centerpiece of the Army Air Corps flight-training program. It was closed in 1946, to be reopened in 1951 as Luke AFB. Since that time, the installation has continued its training mission, training pilots in succeeding generations of F-15s and F-16s.

Tables C–9 through C–11 list the NRHP-related resources for Luke AFB and under the Luke AFB primary airspace.

Table C–9. NRHP-Eligible Archaeological Sites Under Luke AFB Airspace

Site Number	*Description*	*Age*	*General Location*	*NRHP Status*
AZ T:7:47	A sherd and lithic scatter	–	Munitions Storage Area	Potentially Eligible
Luke 03A-01	Artifact scatter	Formative, Pre-classical	Munitions Storage Area	Potentially Eligible
Luke 03A-02	Artifact scatter	Formative	Munitions Storage Area	Potentially Eligible
Luke 03A-03	Artifact scatter	Possible Archaic and Formative period use	Munitions Storage Area	Eligible
Luke 03A-04	Artifact scatter	Formative, Sedentary period	Munitions Storage Area	Potentially Eligible
Luke 03A-05	Artifact scatter	Hohokam Sedentary period	Munitions Storage Area	Eligible
Luke 03A-06	Artifact scatter	Formative	Munitions Storage Area	Potentially Eligible
Luke 03A-09	Artifact scatter	Middle Archaic or earlier	Munitions Storage Area II	Potentially Eligible
Luke 03A-10	Artifact scatter	Middle Archaic or earlier	Munitions Storage Area II	Potentially Eligible

Table C–10. Luke AFB Cold War Era NRHP-Eligible Buildings

Facility No.	*Construction Date*	*Facility Name*	*NRHP Eligibility Recommendation*
Building 1150	–	Blockhouse	Eligible

Table C–11. NRHP-Listed Resources Under Luke AFB Airspace

Airspace	*State*	*County*	*Property*	*Location*
R-2301E (AA High, AA Low)	Arizona	Pima	El Camino Del Diablo	Lukeville
R-2301E	Arizona	Pima	Ajo Townsite Historic District	Ajo
Gladden MOA	Arizona	Yavapai	Camp Date Creek	Date Creek
Gladden MOA	Arizona	La Paz	Harquahala Peak Observatory	Wenden
Gladden MOA	Arizona	Maricopa	Nohlechek, Rhoda, House	Wenden
Sells MOA	Arizona	Pima	Greenway, John and Isabella, House	Ajo
Sells MOA	Arizona	Pima	I'itoi Mo'o–Montezuma's Head and 'Oks Daha–Old Woman Sitting	Ajo
Sells MOA	Arizona	Pima	Bates Well Ranch	Ajo
Sells MOA	Arizona	Pima	Dos Lomitas Ranch	Ajo
Sells MOA	Arizona	Pima	Victoria Mine	Lukeville
Sells MOA	Arizona	Pima	Milton Mine	Lukeville
Sells MOA	Arizona	Pima	Bull Pasture	Lukeville
Sells MOA	Arizona	Pima	Growler Mine Area	Lukeville
VR-239	Arizona	Gila	Salt River Canyon Bridge	Carrizo
VR-239	Arizona	Gila	Coolidge Dam	San Carlos
VR-239	Arizona	Gila	Perkins Store	Young
VR-239	Arizona	Maricopa	Sun-Up Ranch	New River
VR-239	Arizona	Pinal	Picacho Pass Skirmish Site–Overland Mail Co. Stage Station at Picacho Pass	Picacho
VR-239	Arizona	Pinal	Winkelman Bridge	Winkelman
VR-239	Arizona	Yavapai	Verde River Sheep Bridge	Carefree
VR-241	Arizona	Gila	Tonto National Monument, Upper Ruin (AZ U:8:048 ASM)	Roosevelt
VR-241, VR-244	Arizona	Maricopa	Alchesay Canyon Bridge	Roosevelt
VR-241, VR-244	Arizona	Yavapai	Crown King Ranger Station	Crown King
VR-241, VR-244	Arizona	Pinal	Devil's Canyon Bridge	Superior
VR-241, VR-244	Arizona	Maricopa	Pine Creek Bridge	Tortilla Flat
VR-241, VR-244	Arizona	Maricopa	Sunflower Ranger Station	Punkin Center
VR-242, VR-243	Arizona	Maricopa	Gillespie Dam Highway Bridge	Gila Bend
VR-242, VR-243	Arizona	Yavapai	Kirkland Store	Kirkland
VR-242, VR-243	Arizona	Yavapai	Walnut Grove Bridge	Walnut Grove

Source: NRIS 2010.

C.4 Tucson AGS Historical Setting

The Tucson Basin was likely first inhabited approximately 12,000 years ago, when the climate of the American Southwest was cooler and moister than today. Many of the basins were occupied by shallow lakes and wetlands, creating an ideal habitat for birds. The area was host to mammoth, musk ox, giant beaver, mastodon, and sloth. The first human inhabitants are believed to have been big-game hunters living around the edges of the wetlands, who probably supplemented their diet by gathering various plants (Fagan 1991). As the climate gradually became warmer and drier, the vegetation in the Tucson Basin came to resemble the conditions of today. People continued to rely on hunting a variety of smaller game, but also used a wide range of plant resources, as indicated by a marked increase in ground stone processing tools (Davis-Monthan AFB 2004). Eventually, some groups adopted the cultivation of domesticated plants and became less mobile as they relied increasingly on agriculture, particularly maize production. People developed sophisticated irrigation technologies, elaborately decorated ceramics, long-distance trade, and solar calendars. They created social and political systems to manage the higher population densities associated with a successful agriculture-based economy. The Hohokam culture of the Tucson Basin had large population centers, agricultural irrigation, ball courts, and a highly developed ceramic tradition. Toward the end of the 1200s, a major drought occurred throughout the Southwest. By the mid-1400s, all major Hohokam village locations were abandoned, and areas that had seen continuous occupation for 10,000 years were vacated (Davis-Monthan AFB 2004).

In 1690, Spanish explorers recorded contact with the Piman-speaking peoples of the Gila and Salt Rivers. Spaniards were the first Europeans to make contact with the Tohono O'odham people (formerly known as the Papago). The Jesuits, under Father Eusebio Francisco Kino, established a series of missions for them in what is now southern Arizona. In the early 1800s, the Tohono O'odham began moving into the Tucson Basin (Davis-Monthan AFB 2004). Today the Tohono O'odham Nation covers more than 2.8 million acres in the Sonoran Desert, including an Industrial Park near Tucson and San Xavier Reservation, which contains 71,095 acres just south of the city of Tucson (ICA 2003).

The Pascua Yaqui people originally lived in southern Sonora, Mexico, where they farmed and hunted. After the Mexican War of Independence in 1821, the Yaqui gradually moved northward into Arizona. The Yaqui village of Old Pascua was located on the outskirts of Tucson. The village of New Pascua, the seat of Yaqui tribal government, was established after acquisition of reservation land in 1978 (Pascua Yaqui 2005).

The Tucson Presidio was established in 1775, and Tucson became part of Mexico in 1821 (City of Tucson 2007). After the war between the United States and Mexico in 1846, most of New Mexico and Arizona was ceded to the United States American military forts were established by the early 1860s to defend routes of travel through the region. Cattle ranching began after 1865, with American ranchers establishing extensive operations during the 1880s. Most settlement occurred after 1882 and the arrival of the Southern Pacific Railroad. Ranching continued in importance into the twentieth century.

Tucson's aviation history began with the establishment of the Nation's first municipally owned airfield in 1919 on what is now the Tucson Rodeo Grounds. The military presence in Arizona increased markedly leading up to World War II, especially with the establishment of permanent training facilities in the Tucson Basin. The population of Tucson also increased significantly after World War II with the return of veterans who moved to the area after having trained there for the war (ANG 2010).

The 162nd Fighter Wing (162 FW) unit's history dates back to 1956, when the 152nd Fighter Interceptor Squadron of the Arizona Air National Guard flew the Korean War vintage F-86A. At that time, the "base" consisted of an old adobe farmhouse and a dirt-floor hangar with enough space for three aircraft. The Air National Guard officially redesignated the unit as the 162nd Tactical Fighter Training Group and the 152nd Tactical Fighter Squadron in 1969. The unit's new job was producing combat-ready pilots for the F-100 aircraft, which soon expanded to include training international pilots on the Air Force's most modern fighting aircraft. The 162nd Fighter Wing now features new modern buildings, up-to-date equipment, and continually updated technology that keeps pace with its rapidly changing roles and missions (162 FW 2010).

Table C–12 lists the NRHP-related resources beneath the Tucson AGS primary airspace.

Table C–12. NRHP-Listed Resources Under Tucson AGS Airspace

Airspace	*State*	*County*	*Property*	*Location*
Jackal Low MOA	Arizona	Graham	Bonita Store	Bonita
Jackal Low MOA	Arizona	Graham	Columbine Work Station	Safford
Jackal Low MOA	Arizona	Graham	Heliograph Lookout Complex	Old Columbine
Jackal Low MOA	Arizona	Graham	Webb Peak Lookout Tower	Old Columbine
Jackal Low MOA	Arizona	Graham	West Peak Lookout Tower	Bonita
Jackal MOA	Arizona	Graham	Arizona Bank and Trust	Safford
Jackal MOA	Arizona	Graham	Bingham, Richard, House	Safford
Jackal MOA	Arizona	Gila	Black River Bridge	Carrizo
Jackal MOA	Arizona	Graham	Brooks, Paul, House	Safford
Jackal MOA	Arizona	Graham	Buena Vista Hotel	Safford
Jackal MOA	Arizona	Graham	Cross, T. D., House	Safford
Jackal MOA	Arizona	Graham	Davis, William Charles, House	Safford
Jackal MOA	Arizona	Navajo	Fort Apache Historic District	Whiteriver
Jackal MOA	Arizona	Graham	Graham County Courthouse	Safford
Jackal MOA	Arizona	Graham	Horowitz, Joe, House	Safford
Jackal MOA	Arizona	Graham	House at 611 Third Avenue	Safford
Jackal MOA	Arizona	Maricopa	North Central Avenue Streetscape Historic District	Phoenix
Jackal MOA	Arizona	Graham	O'Brien, Mathew, House	Safford
Jackal MOA	Arizona	Graham	Oddfellows Home	Safford
Jackal MOA	Arizona	Graham	Olney, George A., House	Safford
Jackal MOA	Arizona	Graham	Packer, Alonzo Hamilton, House	Safford
Jackal MOA	Arizona	Graham	Ridgeway, David, House	Safford
Jackal MOA	Arizona	Graham	Safford High School	Safford
Jackal MOA	Arizona	Graham	Southern Pacific Railroad Depot	Safford
Jackal MOA	Arizona	Graham	Talley, Hugh, House	Safford
Jackal MOA	Arizona	Graham	Talley, William, House	Safford

Airspace	*State*	*County*	*Property*	*Location*
Jackal MOA	Arizona	Graham	Welker, James R., House	Safford
Jackal MOA	Arizona	Graham	Wickersham, David, House	Safford
Jackal MOA	Arizona	Graham	Williams, Dan, House	Safford
Jackal MOA	Arizona	Graham	Wilson, J. Mark, House	Safford
Jackal MOA	Arizona	Graham	Woman's Club	Safford
Morenci MOA, Rustler Airspace	Arizona	Greenlee	Black Gap Bridge	Clifton
Morenci MOA, Rustler Airspace	Arizona	Greenlee	Clifton Casa Grande Building	Clifton
Morenci MOA, Rustler Airspace	Arizona	Greenlee	Clifton Townsite Historic District	Clifton
Morenci MOA, Rustler Airspace	Arizona	Greenlee	Gila River Bridge	Clifton
Morenci MOA, Rustler Airspace	Arizona	Graham	Kearny Campsite and Trail	Safford
Morenci MOA, Rustler Airspace	Arizona	Greenlee	Park Avenue Bridge	Clifton
Morenci MOA, Rustler Airspace	Arizona	Greenlee	Potter, Dell, Ranch House	Clifton
Morenci MOA, Rustler Airspace	Arizona	Greenlee	Solomonville Road Overpass	Clifton
Morenci MOA, VR 263	Arizona	Greenlee	Billingsley, Benjamin F., House	Duncan
Outlaw MOA	Arizona	Gila	Besh-Ba-Gowah	Globe
Outlaw MOA	Arizona	Gila	Bullion Plaza School	Miami
Outlaw MOA	Arizona	Pinal	Butte-Cochran Charcoal Ovens	Florence
Outlaw MOA	Arizona	Gila	Coolidge Dam	San Carlos
Outlaw MOA	Arizona	Gila	Cordova Avenue Bridge	Miami
Outlaw MOA	Arizona	Pinal	Devil's Canyon Bridge	Superior
Outlaw MOA	Arizona	Gila	Dominion Hotel	Globe
Outlaw MOA	Arizona	Gila	Elks Building	Globe
Outlaw MOA	Arizona	Gila	Gila County Courthouse	Globe
Outlaw MOA	Arizona	Gila	Gila Pueblo	Globe
Outlaw MOA	Arizona	Gila	Gila Valley Bank and Trust Building	Globe
Outlaw MOA	Arizona	Gila	Globe Downtown Historic District	Globe
Outlaw MOA	Arizona	Gila	Globe Mine Rescue Station	Globe
Outlaw MOA	Arizona	Gila	Holy Angels Church	Globe
Outlaw MOA	Arizona	Gila	Inspiration Avenue Bridge	Miami
Outlaw MOA	Arizona	Gila	International House	Globe
Outlaw MOA	Arizona	Pinal	Kelvin Bridge	Kelvin
Outlaw MOA	Arizona	Gila	Keystone Avenue Bridge	Miami
Outlaw MOA	Arizona	Pinal	Magma Hotel	Superior
Outlaw MOA	Arizona	Gila	Miami Avenue Bridge	Miami
Outlaw MOA	Arizona	Gila	Miami Community Church	Miami
Outlaw MOA	Arizona	Pinal	Mineral Creek Bridge	Kelvin
Outlaw MOA	Arizona	Gila	Pinal Ranger Station	Globe
Outlaw MOA	Arizona	Pinal	Queen Creek Bridge	Superior/Florence Junction
Outlaw MOA	Arizona	Gila	Reppy Avenue Bridge	Miami

Airspace	*State*	*County*	*Property*	*Location*
Outlaw MOA	Arizona	Gila	Salt River Bridge	Roosevelt
Outlaw MOA	Arizona	Gila	Soderman Building	Miami
Outlaw MOA	Arizona	Gila	St. John's Episcopal Church	Globe
Outlaw MOA	Arizona	Pinal	Thompson, Boyce, Southwestern Arboretum	Superior
Outlaw MOA	Arizona	Gila	US Post Office and Courthouse--Globe Main	Globe
Outlaw MOA	Arizona	Pinal	Winkelman Bridge	Winkelman
R 2301E	Arizona	Pima	El Camino Del Diablo	Lukeville
Reserve MOA	Arizona	Apache	Alpine Elementary School	Alpine
Reserve MOA, Rustler Airspace	Arizona	Greenlee	Bear Mountain Lookout Complex	Mogollon Rim
Reserve MOA, Rustler Airspace	New Mexico	Catron	Bearwallow Mountain Lookout Cabins and Shed	Bearwallow Park
Reserve MOA, Rustler Airspace	New Mexico	Catron	Mogollon Baldy Lookout Cabin	Mogollon Baldy Peak
Reserve MOA, Rustler Airspace	New Mexico	Catron	Mogollon Historic District	Mogollon
Reserve MOA, Rustler Airspace	Arizona	Apache	PS Knoll Lookout Complex	Maverick
Reserve MOA, Rustler Airspace	New Mexico	Catron	Socorro Mines Mining Company Mill, Fannie Hill	Mogollon
Ruby 1 MOA	Arizona	Santa Cruz	Ruby	Ruby and Vicinity
Sells MOA	Arizona	Pima	Ajo Townsite Historic District	Ajo
Sells MOA	Arizona	Pima	Bates Well Ranch	Ajo
Sells MOA	Arizona	Pima	Bull Pasture	Lukeville
Sells MOA	Arizona	Pima	Dos Lomitas Ranch	Ajo
Sells MOA	Arizona	Pima	Greenway, John and Isabella, House	Ajo
Sells MOA	Arizona	Pima	Growler Mine Area	Lukeville
Sells MOA	Arizona	Pima	I'itoi Mo'o--Montezuma's Head and 'Oks Daha--Old Woman Sitting	Ajo
Sells MOA	Arizona	Pima	Milton Mine	Lukeville
Sells MOA	Arizona	Pima	Victoria Mine	Lukeville
Tombstone A MOA	Arizona	Cochise	Pearce General Store	Pearce
Tombstone A MOA, VR 263	Arizona	Cochise	Monte Vista Lookout Cabin	Elfrida
Tombstone A MOA, VR 263	Arizona	Cochise	Cima Park Fire Guard Station	Douglas
Tombstone B MOA	Arizona	Cochise	San Bernardino Ranch	Douglas
Tombstone C MOA	Arizona	Cochise	Bisbee Historic District	Bisbee
Tombstone C MOA	Arizona	Cochise	Bisbee Woman's Club Clubhouse	Bisbee
Tombstone C MOA	Arizona	Cochise	Douglas Historic District	Douglas
Tombstone C MOA	Arizona	Cochise	Douglas Municipal Airport	Douglas
Tombstone C MOA	Arizona	Cochise	Douglas Residential Historic District	Douglas
Tombstone C MOA	Arizona	Cochise	Douglas Sonoran Historic District	Douglas
Tombstone C MOA	Arizona	Cochise	Douglas Underpass	Douglas

Airspace	*State*	*County*	*Property*	*Location*
Tombstone C MOA	Arizona	Cochise	Douglas, Walter, House	Bisbee
Tombstone C MOA	Arizona	Cochise	El Paso and Southwestern Railroad Passenger Depot--Douglas	Douglas
Tombstone C MOA	Arizona	Cochise	El Paso and Southwestern Railroad YMCA	Douglas
Tombstone C MOA	Arizona	Cochise	Evergreen Cemetery	Bisbee
Tombstone C MOA	Arizona	Cochise	Gadsden Hotel	Douglas
Tombstone C MOA	Arizona	Cochise	Grand Theatre	Douglas
Tombstone C MOA	Arizona	Cochise	Muheim House	Bisbee
Tombstone C MOA	Arizona	Cochise	Naco Border Station	Naco
Tombstone C MOA	Arizona	Cochise	Our Lady of Victory Catholic Church	Pearce
Tombstone C MOA	Arizona	Cochise	Phelps Dodge General Office Building	Bisbee
Tombstone C MOA	Arizona	Cochise	St. Patrick's Roman Catholic Church	Bisbee
Tombstone C MOA	Arizona	Cochise	Treu, John, House	Bisbee
Tombstone C MOA	Arizona	Cochise	US Post Office and Customs House--Douglas Main	Douglas
Tombstone C MOA, VR 263	Arizona	Cochise	Geronimo Surrender Site	Douglas
VR 263	Arizona	Graham	Sierra Bonita Ranch	Bonita

Source: NRIS 2010.

C.5 References

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C.6 SHPO Letters

The following letter is an example of the Interagency/Intergovernmental Coordination for Environmental Planning (IICEP) letters sent to each State Historic Preservation Office (SHPO) to initiate Section 106 consultation on the effects of the proposed F-35A beddown. Table C–13 provides a listing of the SHPOs contacted and a compilation of the responses received.

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

MEMORANDUM FOR STATE HISTORIC PRESERVATION OFFICE
ATTENTION: NAME
Address
City, State Zip

FROM: HQ AETC/A7C
266 F Street West
Randolph Air Force Base, Texas 78150-4319

SUBJECT: F-35A Training Environmental Impact Statement (EIS)

1. The U.S. Air Force is in the initial stages of preparing an EIS under the National Environmental Policy Act (NEPA) to assess the potential environmental consequences of establishing F-35A Joint Strike Fighter training aircraft at any of the following locations: Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho, Eglin Air Force Base, Florida, Holloman Air Force Base, New Mexico, Luke Air Force Base, Arizona, or Tucson International Airport Air Guard Station, Arizona. Please refer to the attachment for a map of the locations.

2. The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. Airspace training would include the use of defensive flare countermeasures, lasers and supersonic flight in authorized airspace and the use of inert or live munitions at approved military ranges. F-35A training would occur within the current military airspace and ranges of the proposed installations.

3. Pursuant to the NEPA, the Air Force will analyze potential environmental effects associated with changes in personnel, construction of facilities and training activities in existing military airspace and ranges to support the proposed beddown. The EIS will address the potential effects at each of the locations identified above. A no-action alternative will also be examined that does not beddown F-35A aircraft at any installation.

4. The purpose of this correspondence is to initiate Section 106 process of the National Historic Preservation Act (NHPA) of 1966 (as amended) in the potentially affected areas. We are in the early stages of gathering information concerning previous archaeological and historical studies for the areas under the affected region. We would appreciate any assistance you could provide in identifying and retrieving this important information, as well as concerns you may have about the potential effects of the Proposed Action on significant cultural resources.

5. The Air Force intends to coordinate public involvement for the purpose of Section 106 review under the NHPA with public involvement in the EIS prepared under the Environmental Impact Analysis Process.

6. The Air Force's notice of intent to produce an EIS was published in the *Federal Register* on December 28, 2009.

7. Public and agency comments received by the Air Force during the scoping period and throughout the environmental process will be considered in the preparation of the EIS. We look forward to hearing from you no later than March 25, 2010 to incorporate updated information in the Draft EIS. We request that you send comments to our SAIC contractor, Ms. Lorraine Gross, at 405 South 8th Street, Suite 301, Boise, Idaho, 83702. We would appreciate you identifying a point of contact for any follow-up questions.

8. If you have specific questions about the proposal, we would like to hear from you. Please contact Mr. David Martin, AETC NEPA Program Manager, at (210) 652-1961. Thank you for your assistance in this matter.

MARK A. CORRELL, Colonel, USAF
The Civil Engineer

Attachment:
Map of Potential Basing Locations

Table C–13. State Historic Preservation Office Consultation Letters

Addressee	*Date Sent*	*Response Received*	*Date Sent*	*Response Received*
Boise AGS	**IICEP Letter**		**Consultation Letter**	
Ms. Suzi Pengilly Compliance Coordinator and Deputy SHPO Idaho State Historic Preservation Office 210 Main Street Boise, ID 83702	02/03/10		11/09/11	01/13/12 received letter from SHPO that states "Based on the information currently available, it appears that basing the F-35A Training Mission at Boise Air Terminal Air Guard Station will have no effect on historic properties."
Ms. Janet Gallimore Idaho State Historical Society 2205 Old Penitentiary Road Boise, ID 83712	02/03/10			See response above.
Mr. Wilson G. Martin State Historic Preservation Officer Utah State Historic Preservation Office 300 S. Rio Grande Street Salt Lake City, UT 84101			04/26/12	Phone Call: 04/11/12, 05/08/12. SHPO does not believe that they have any concerns.
Ms. Susan Haylock Oregon SHPO Compliance Oregon State Historic Preservation Office 725 Summer Street NE, Suite C Salem, OR 97301			01/12/12	02/07/12 received letter from SHPO that states "agree there will be no direct affect to cultural resources in Oregon." Phone Call: 05/08/12.
Dr. Mark Baumler State Historic Preservation Officer Montana State Historic Preservation Office 1410 Eighth Avenue Helena, MT 59620			04/26/12	Phone Call: 04/17/12. Idaho National Guard received letter dated 05/04/12 from MT SHPO concurring with finding that no historic properties would be affected by basing at Boise AGS.
Mr. Ronald M. James State Historic Preservation Officer and Historian Nevada State Historic Preservation Office 901 S. Stewart Street, Suite 5004 Carson City, NV 89701-4285			04/26/12	Phone Call: 05/11/12. Nevada SHPO review of EIS has not found any reason not to concur with finding of no affected on historic properties.
Ms. Rebecca Lynn Palmer Deputy, State Historic Preservation Officer 901 S. Stewart Street, Suite 5004 Carson City, NV 89701-5248			05/21/12	05/21/12 received letter from SHPO that states, "the proposed undertaking will not pose an effect to historic properties."

Addressee	*Date Sent*	*Response Received*	*Date Sent*	*Response Received*
Holloman AFB	**IICEP Letter**		**Consultation Letter**	
Ms. Jan V. Biella State Historic Preservation Officer New Mexico Historic Preservation Division 407 Galisteo Street, Suite 236 Santa Fe, NM 87501	02/03/10		01/12/12	Phone Call: 04/11/12. State is preparing letter of concurrence, with understanding that Luke AFB is Preferred Alternative. If Air Force comes to Holloman AFB in the future, then a Programmatic Agreement may be needed.
Mr. Sam Cata New Mexico Historic Preservation Division Dept of Cultural Affairs 407 Galisteo Street, Suite 236 Santa Fe, NM 87501	02/03/10		01/12/12	See response above.
Mr. Mark Wolfe State Historic Preservation Officer Texas Historical Commission 108 W. 16th Street Austin, TX 78701			01/12/12	Phone Call: 04/11/12. SHPO Agency has no concerns as there is only over flight with no effect expected on installations.
Luke AFB	**IICEP Letter**		**Consultation Letter**	
Mr. James Garrison State Historic Preservation Officer Arizona State Historic Preservation Office 1300 West Washington Street Phoenix, AZ 85007	02/03/10	03/04/10	01/12/12	Phone Call: 05/03/12. Luke AFB received letter of concurrence from AZ SHPO dated 05/01/12.
Mr. Bob Estes Archaeologist New Mexico Historic Preservation Division 407 Galisteo Street, Suite 236 Santa Fe, NM 87501			05/04/12	Phone Call: 05/15/12. Luke received letter of concurrence from NM SHPO dated 05/15/12.
Tucson AGS	**IICEP Letter**		**Consultation Letter**	
Mr. James Garrison State Historic Preservation Officer Arizona State Historic Preservation Office 1300 West Washington Street Phoenix, AZ 85007	02/11/10	03/04/10	01/12/12	Phone Call: 05/03/12. Luke AFB received letter of concurrence from AZ SHPO dated 05/01/12 that also includes Tucson AGS.
Mr. Bob Estes Archaeologist New Mexico Historic Preservation Division 407 Galisteo Street, Suite 236 Santa Fe, NM 87501			05/04/12	Phone Call: 05/15/12. Luke received letter of concurrence from NM SHPO dated 05/15/12 that also includes Tucson AGS.

C.7 SHPO Response Letters

The following letters were received by the Air Force in response to the SHPO letters sent to initiate Section 106 consultation.

MIR
SHPO-2010-0232 (96726)

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

RECEIVED
FEB 08 2010
AH 2/10/10
ARIZONA STATE PARKS S.H.P.O.

FEB 03 2010

MEMORANDUM FOR ARIZONA STATE HISTORIC PRESERVATION OFFICE
ATTENTION: MR. JAMES GARRISON
1300 West Washington Street
Phoenix, Arizona 85007

FROM: HQ AETC/A7C
266 F Street West
Randolph Air Force Base, Texas 78150-4319

SUBJECT: F-35A Training Environmental Impact Statement (EIS)

1. The U.S. Air Force is in the initial stages of preparing an EIS under the National Environmental Policy Act (NEPA) to assess the potential environmental consequences of establishing F-35A Joint Strike Fighter training aircraft at any of the following locations: Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho, Eglin Air Force Base, Florida, Holloman Air Force Base, New Mexico, Luke Air Force Base, Arizona, or Tucson International Airport Air Guard Station, Arizona (see Atch 1).

2. The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. Airspace training would include the use of defensive flare countermeasures, lasers and supersonic flight in authorized airspace and the use of inert or live munitions at approved military ranges. F-35A training would occur within the current military airspace and ranges of the proposed installations.

3. Pursuant to the NEPA, the Air Force will analyze potential environmental effects associated with changes in personnel, construction of facilities and training activities in existing military airspace and ranges to support the proposed beddown. The EIS will address the potential effects at each of the locations identified above. A no-action alternative will also be examined that does not beddown F-35A aircraft at any installation.

4. The purpose of this correspondence is to initiate Section 106 process of the National Historic Preservation Act (NHPA) of 1966 (as amended) in the potentially affected areas. We are in the early stages of gathering information concerning previous archaeological and historical studies for the areas under the affected region. We would appreciate any assistance you could provide in identifying and retrieving this important information, as well as concerns you may have about the potential effects of the Proposed Action on significant cultural resources.

5. The Air Force will host public open house scoping meetings in communities near the proposed beddown locations. Please refer to the attached list and flier for meeting locations and dates (see Atchs 2 and 3). Please post the flier in a location that may be viewed by the public. The Air Force intends to coordinate public involvement for the purpose of Section 106 review under the NHPA using the public involvement in the EIS.

6. During the scoping meetings, which will be held from 6 to 9 p.m. in an open-house format, Air Force representatives will describe the Proposed Action and alternatives, explain the NEPA process, outline opportunities for public involvement and answer questions about the proposal. Interested parties or citizens are welcome to join the meeting at any time since information will be provided throughout the duration of the open house. The Air Force's notice of intent to produce an EIS and hold scoping meetings was published in the *Federal Register* on December 28, 2009, and will also be published in local newspapers approximately 2 weeks prior to the scoping meetings.

7. Public and agency comments received by the Air Force during the scoping period and throughout the environmental process will be considered in the preparation of the EIS. We look forward to hearing from you no later than April 5, 2010 to incorporate updated information in the Draft EIS. We request that you send comments to our SAIC contractor, Ms. Lorraine Gross, at 405 South 8th Street, Suite 301, Boise, Idaho, 83702. We would appreciate you identifying a point of contact for any follow-up questions.

8. If you have specific questions about the proposal, we would like to hear from you. Please contact Mr. David Martin, AETC NEPA Program Manager, at (210) 652-1961. Thank you for your assistance in this matter.

MARK A. CORRELL, Colonel, USAF
The Civil Engineer

Attachments:
1. Map of Potential Basing Locations
2. Scoping Meeting Locations and Dates
3. Scoping Meeting Flier

We look forward to reviewing your Agency's Section 106 consultation for this undertaking in AZ.
Ann S. Howard 3-4-10
for AZSHPO

SHPO-2010-0232(76782) MIR

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

RECEIVED
AH 2/17/10
FEB 12 2010

FEB 11 2010 ARIZONA STATE PARKS/S.H.P.O.

MEMORANDUM FOR ARIZONA STATE HISTORIC PRESERVATION OFFICE
ATTENTION: MR. JAMES GARRISON
1300 West Washington Street
Phoenix, Arizona 85007

FROM: HQ AETC/A7C
266 F Street West
Randolph Air Force Base, Texas 78150-4319

SUBJECT: F-35A Training Environmental Impact Statement (EIS)

1. The U.S. Air Force is in the initial stages of preparing an EIS under the National Environmental Policy Act (NEPA) to assess the potential environmental consequences of establishing F-35A Joint Strike Fighter training aircraft at any of the following locations: Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho; Eglin Air Force Base, Florida; Holloman Air Force Base, New Mexico; Luke Air Force Base, Arizona; or Tucson International Airport Air Guard Station, Arizona (see Atch 1).

2. The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. Airspace training would include the use of defensive flare countermeasures, lasers and supersonic flight in authorized airspace and the use of inert or live munitions at approved military ranges. F-35A training would occur within the current military airspace and ranges of the proposed installations.

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4. The purpose of this correspondence is to initiate Section 106 process of the National Historic Preservation Act (NHPA) of 1966 (as amended) in the potentially affected areas. We are in the early stages of gathering information concerning previous archaeological and historical studies for the areas under the affected region. We would appreciate any assistance you could provide in identifying and retrieving this important information, as well as concerns you may have about the potential effects of the Proposed Action on significant cultural resources.

5. The Air Force will host public open house scoping meetings in communities near the proposed beddown locations. Please refer to the attached list and flier for meeting locations and dates (see Atchs 2 and 3). Please post the flier in a location that may be viewed by the public. The Air Force intends to utilize public involvement in the EIS prepared under the Environmental Impact Analysis Process will accomplish public involvement for the purpose of Section 106 review under the NHPA.

6. During the scoping meetings, which will be held from 6 to 9 p.m. in an open-house format, Air Force representatives will describe the Proposed Action and alternatives, explain the NEPA process, outline opportunities for public involvement and answer questions about the proposal. Interested parties or citizens are welcome to join the meeting at any time since information will be provided throughout the duration of the open house. The Air Force's notice of intent to produce an EIS and hold scoping meetings was published in the *Federal Register* on December 28, 2009, and will also be published in local newspapers approximately 2 weeks prior to the scoping meetings.

7. Public and agency comments received by the Air Force during the scoping period and throughout the environmental process will be considered in the preparation of the EIS. We look forward to hearing from you no later than April 5, 2010 to incorporate updated information in the Draft EIS. We request that you send comments to our SAIC contractor, Ms. Lorraine Gross, at 405 South 8th Street, Suite 301, Boise, Idaho, 83702. We would appreciate you identifying a point of contact for any follow-up questions.

8. If you have specific questions about the proposal, we would like to hear from you. Please contact Mr. David Martin, AETC NEPA Program Manager, at (210) 652-1961. Thank you for your assistance in this matter.

DAVID H. DENTINO
Deputy Civil Engineer

Attachments:
1. Map of Potential Basing Locations
2. Scoping Meeting Locations and Dates
3. Scoping Meeting Flier

See comments provided on your 2/3/10 letter to us which appears to be identical to this letter.
Thank you.
Ann G. Howard 3-4-10
for AZSHPO

www.history.idaho.gov

Idaho • State Historical Society

C.L. "Butch" Otter
Governor of Idaho

Janet Gallimore
Executive Director

Administration
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 334-2682
Fax: (208) 334-2774

Membership and Fund Development
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 514-2318
Fax: (208) 334-2774

Historical Museum and Education Programs
610 North Julia Davis Drive
Boise, Idaho 83702-7695
Office: (208) 334-3120
Fax: (208) 334-4059

State Historic Preservation Office and Historic Sites
Archeological Survey of Idaho
210 Main Street
Boise, Idaho 83702-7264
Office: (208) 334-3861
Fax: (208) 334-2775

Statewide Sites
• Franklin Historic Site
• Pierce Courthouse
• Rock Creek Station and
• Stricker Homesite

Old Penitentiary
2445 Old Penitentiary Road
Boise, Idaho 83712-8254
Office: (208) 334-2844
Fax: (208) 334-3225

Idaho State Archives
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 334-2620
Fax: (208) 334-2626

North Idaho Office
112 West 4th Street, Suite #7
Moscow, Idaho 83843
Office: (208) 882-1540
Fax: (208) 882-1763

DATE: January 13, 2012
TO: Jake Fruhlinger, Idaho National Guard
FEDERAL AGENCY: DOD
PROJECT NAME: Basing of F-35A Joint Strike Fighter Training Mission at Boise Air Terminal Air Guard Station

Section 106 Evaluation

	The field work and documentation presented in this report meet the Secretary of the Interior's Standards
X	No additional investigations are recommended. Project can proceed as planned.
	Additional information is required to complete the project review. (See comments below.)
	Additional investigations are recommended. (See comments below).

Identification of Historic Properties (36 CFR 900.4):

	No historic properties were identified within the project area.
	Property is not eligible. Reason:
	Property is eligible for listing in the National Register of Historic Places
	Criterion: _A _B _C _D Context for Evaluation: Architecture.
X	*No historic properties* will be affected within the project area.

Assessment of Adverse Effects (36 CFR 800.5):

	Project will have *no adverse effect* on historic properties.
	Property will have an *adverse effect* on historic properties. Additional consultation is required.

Comments:
Based on the information currently available, it appears that basing the F-35A Training Mission at Boise Air Terminal Air Guard Station will have no effect on historic properties.

Susan Pengilly

Susan Pengilly, Deputy SHPO
State Historic Preservation Office

January 13, 2012
Date

Oregon
John A. Kitzhaber, MD, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE, Ste C
Salem, OR 97301-1266
(503) 986-0671
Fax (503) 986-0793
www.oregonheritage.org

February 7, 2012

Mr. David DeMartino
Department of the Air Force
HQ AETC/A7CPP
Randolph AFB, TX 78150

RE: SHPO Case No. 12-0072
F-35A Pilot Training Center & Basing Proj (Various Locations throughout Oregon)
Draft EIS (Vol. 1)
USAF
Multiple legals, Various, Various County

Dear Mr. DeMartino:

Our office recently received draft EIS about the project referenced above. I have reviewed the cultural resources section and agree there will be no direct affect to cultural resources in Oregon. As mentioned in the EIS there have been Traditional Cultural Properties (TCP) identified within the indirect APE. Many of these TCPs have not been formally documented As such, the National Register eligibility status of these TCPs has not been determined they will be treated as eligible. Our office recommends continued consultation with the appropriate Tribes to resolve any potential adverse impacts to TCPs as stated in the EIS. If adverse effects to TCPs are expected, consultation with our office and the Tribe is required to mitigate those effects.

Please be aware, however, that if during development activities you or your staff encounters any cultural material (i.e., historic or prehistoric), all activities should cease immediately and an archaeologist should be contacted to evaluate the discovery. Under state law (ORS 358.905-955) it is a Class B misdemeanor to impact an archaeological site on public or private land in Oregon. Impacts to Native American graves and cultural items are considered a Class C felony (ORS 97.740-760). If you have any questions regarding any future discovery or my letter, feel free to contact our office at your convenience.

Sincerely,

Matt Diederich, MAIS
SHPO Archaeologist
(503) 986-0577
Matthew.Diederich@state.or.us

SHPO-2010-0232(100856)

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

RECEIVED
APR 20 2012
ARIZONA STATE PARKS/S.H.P.

NHPA

APR 19 2012

Brigadier General Jerry D. Harris, Jr.
Commander, 56th Fighter Wing
14185 West Falcon Street
Luke AFB AZ 85309-1629

Ann Howard, Archaeologist/Public Programs Manager
State Historic Preservation Office
1300 West Washington
Phoenix AZ 85007

SUBJECT: Section 106 Review of Proposed Basing of the F-35A Joint Strike Fighter Training Mission at Luke Air Force Base or Tucson Air Guard Station, Arizona

Dear Ms. Howard

The Air Force has distributed a Draft Environmental Impact Statement (DEIS) which analyzes the potential environmental impacts of basing F-35A training at one or more of four alternative locations: Boise Air Terminal Air Guard Station (AGS), Idaho; Holloman Air Force Base (AFB), New Mexico; Luke AFB, Arizona; or Tucson International Airport AGS, Arizona. A no-action alternative which would not locate F-35A training at any of these installations also is examined. The DEIS analyzes the potential environmental effects of changes in personnel, construction of facilities, and use of existing facilities to support F-35A training in existing military airspace and ranges at the proposed locations.

To minimize effort on the part of all consulting parties, Section 106 review of basing F-35A training at either Luke AFB or Tucson AGS has been combined in a single consultation process, with Luke AFB serving as lead agency. As a part of this effort, consultation letters have been sent and phone calls made to tribal leaders and staff, and Luke AFB staff has met with representatives of several tribes. The results of those efforts are summarized in Attachment 1.

As the analysis presented in the DEIS indicates, no historic properties are located in the areas where ground-disturbing construction activity associated with F-35A training would occur, and historic properties such as buildings, structures, and archaeological sites will not be adversely affected by F-35A training in existing military use airspace, which is shown on Attachment 2. Consultation with tribes that attach cultural importance to places in the area of potential effect has not identified other historic properties that might be adversely affected by overflights.

At this time, the Air Force requests your concurrence with our finding that no historic properties would be affected by basing the F-35A training program at either Luke AFB or Tucson AGS. Whether or not F-35A training is ultimately based at either Luke AFB or Tucson AGS, the installations will continue to consult with affected tribes regarding management of the lands and airspace depicted on Attachment 2, as needed. If you have questions or would like to arrange a meeting, please call Mr. Kevin O'Berry, Luke AFB Native American Liaison, at (623) 856-5857 or Ms. Carol Heathington, Operations Planner, at (623) 856-9469.

Your response by 30 April regarding our assessment of impacts to historic properties would facilitate adherence to our timeline for this endeavor. Colonel Mike McGuire, the 162d Fighter Wing Commander at the Tucson AGS, and I appreciate your cooperation.

Sincerely

JERRY D. HARRIS, JR.
Brigadier General, USAF

Attachments:
Summary of Tribal Outreach
Map of Area of Potential Effect

CONCUR
for Ann G. Howard 5-1-12
ARIZONA STATE HISTORIC PRESERVATION OFFICER
ARIZONA STATE PARKS BOARD

20120430 21

IDAHO NATIONAL GUARD
JOINT FORCE HEADQUARTERS
4040 West Guard St., Bldg 600
Boise, Idaho 83705-5004

PETE DOD/AIR FORCE

25 April 2012

RECEIVED
APR 30 2012
BY: SHPO

Jake Fruhlinger
Cultural Resources Program Manager
Idaho National Guard
Gowen Field, Building 518
4715 South Byrd Street
Boise, Idaho 83705-8095

CONCUR
MONTANA SHPO
5/4/12

Mark Baumler
State Historic Preservation Office
1410 Eighth Avenue.
Helena, MT., 59620

SUBJECT: Section 106 Review of Proposed Basing of the F-35A Joint Strike Fighter Training Mission at Boise Air Terminal Air Guard Station (AGS)

Dear Mr. Baumler,

The Air Force has distributed a Draft Environmental Impact Statement (DEIS) which analyzes the potential environmental impacts of basing F-35A training at one or more of four alternative locations: Boise Air terminal Guard Station(AGS), Idaho; Holloman AFB, New Mexico; Luke AFB, Arizona; or Tucson International Airport AGS, Arizona. A no-action alternative which would not locate F-35A training at any of these installations also is examined.

The DEIS analyzes the potential environmental effects of changes in personnel, construction of facilities, and use of existing facilities to support F-35A training in existing military airspace and ranges at the proposed locations. A copy of the DEIS was mailed to your office; if you did not receive it or need additional copies, please let me know.

As part of the Section 106 review of basing F-35A training at Boise Air Terminal Air Guard Station (AGS) consultation letters have been sent and phone calls have been made to tribal leaders and staff. Additionally, Idaho National Guard (IDNG) staff has requested to meet with representatives of several tribes.

As the analysis presented in the DEIS indicates, no historic properties are located in the areas where ground-disturbing construction activity associated with F-35A training would occur. Historic properties such as buildings, structures, and archaeological sites will not be adversely affected by F-35A training in existing military use airspace, which is shown in Attachment 1. Consultation with Tribes that attach cultural importance to places in the area of potential effect has not identified other historic properties that might be adversely affected by over flights.

At this time, the IDNG requests your concurrence with our finding that no historic properties would be affected by basing the F-35A training program at the Boise Air Terminal Air Guard Station. Whether or not F-35A training is ultimately based at the Boise AGS, the installation will continue to consult with affected Tribes regarding management of lands and airspace depicted on attachment 1, as needed.

The IDNG looks forward to receiving any input you may have regarding this endeavor. If you have any questions or would like to arrange a meeting, please contact me at (208)-272-4192 or jake.fruhlinger@us.army.mil. Written comments may be directed to me at the address above, and if possible, should be received within 30 days of receipt of this letter.

Sincerely

Jake Fruhlinger
Cultural Resources Program Manager
Idaho National Guard

Attachment:
F-35A Basing Summary Materials

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

James R. Uken
Director, Range Management Office
56th Fighter Wing
7101 Jerstad Lane
Luke AFB AZ 85309-1629

MAY 4 2012

Bob Estes, Archaeologist
New Mexico Historic Preservation Division
Department of Cultural Affairs
407 Galisteo Street, Suite 236
Santa Fe, NM 87501

JRE
HISTORIC PRESERVATION DIVISION
94424

SUBJECT: Section 106 Review of Proposed Basing of the F-35A Joint Strike Fighter Training Mission at Luke Air Force Base or Tucson Air Guard Station, Arizona

Dear Mr. Estes

The Air Force has distributed a Draft Environmental Impact Statement (DEIS) which analyzes the potential environmental impacts of basing F-35A training at one or more of four alternative locations: Boise Air Terminal Air Guard Station (AGS), Idaho; Holloman Air Force Base (AFB), New Mexico; Luke AFB, Arizona; or Tucson International Airport AGS, Arizona. A no-action alternative which would not locate F-35A training at any of these installations also is examined. The DEIS analyzes the potential environmental effects of changes in personnel, construction of facilities, and use of existing facilities to support F-35A training in existing military airspace and ranges at the proposed locations.

For the potential basing of F-35A aircraft in Arizona, Section 106 review for training at either Luke AFB or Tucson AGS has been combined in a single consultation process, with Luke AFB serving as lead agency. As a part of this effort, consultation letters have been sent and phone calls made to tribal leaders and staff, and Luke AFB staff has met with representatives of several tribes. The results of those efforts are summarized in Attachment 1.

As the analysis presented in the DEIS indicates, historic properties such as buildings, structures, and archaeological sites will not be adversely affected by F-35A training in existing military use airspace (map at Attachment 2), which inlcudes some training airspace in New Mexico. Consultation with tribes that attach cultural importance to places in the area of potential effect has not identified other historic properties that might be adversely affected by overflights.

At this time, the Air Force requests your concurrence with our finding that no historic properties would be affected by basing the F-35A training program at either Luke AFB or Tucson AGS. Whether or not F-35A training is ultimately based at either Luke AFB or Tucson AGS, the installations will continue to consult with affected tribes regarding management of the lands and airspace depicted on Attachment 2, as needed. If you have questions or would like to arrange a meeting, please call Mr. Kevin O'Berry, Luke AFB Native American Liaison, at (623) 856-5857 or Ms. Carol Heathington, Operations Planner, at (623) 856-9469.

A response by 11 May 2012 regarding our assessment of impacts to historic properties would facilitate adherence to our timeline for this endeavor. Thank you for your time and efforts regarding this endeavor.

Sincerely

James R. Uken
JAMES R. UKEN, GS-14, USAF
Director, 56th Range Management Office

Attachments:
Summary of Tribal Outreach
Map of Area of Potential Effect

Concur with recommendations as proposed.
for NM State Historic Preservation Officer

LEO M. DROZDOFF, P.E.
Director
Department of Conservation and Natural Resources

RONALD M. JAMES
State Historic Preservation Officer

BRIAN SANDOVAL
Governor

STATE OF NEVADA

Address Reply to:
901 S. Stewart Street, Suite 5004
Carson City, NV 89701-5248
Phone: (775) 684-3448
Fax: (775) 684-3442

www.nvshpo.org

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE

May 21, 2012

Jake Fruhlinger
Cultural Resources Program Manager
Idaho National Guard
Gowen Field, Building 518
4715 South Byrd Street
Boise Idaho 83705-8095

RE: Proposed Basing of the F-35A Joint Strike Fighter Training Mission at Boise Air Terminal Air Guard Station (AGS) (Undertaking #2012-2107).

Dear Mr. Fruhlinger:

The Nevada State Historic Preservation Office (SHPO) reviewed the subject undertaking. The SHPO concurs with the Idaho National Guard's determination, on behalf of the U.S. Air Force, that the proposed undertaking will not pose an effect to historic properties.

The SHPO notes that the Idaho National Guard and the U.S. Air Force has initiated and continues consultation with Native American representatives to identify properties of traditional religious or cultural significance that could be affected by the undertaking. If this consultation results in the identification of historic properties, the SHPO requests that U.S. Air Force submit official determinations of National Register eligibility and amended findings of effect for our review and concurrence.

One final note, the SHPO could find no reference to your consultation with this office, or previous consultation with this office during scoping, in the draft EIS for the undertaking. In addition, neither this office nor the Nevada State Clearinghouse are referenced in the draft EIS distribution list. For future NEPA documents, the SHPO recommends that the Nevada State Clearinghouse be consulted. Just to ensure the record is accurate, the SHPO recommends that our office be added as we have been consulted.

If you have any questions concerning this correspondence, please feel free to contact me at (775) 684-3443 or by e-mail at rlpalmer@shpo.nv.gov.

Sincerely,

Rebecca Lynn Palmer, Deputy
State Historic Preservation Officer

C.8 Tribal Letters

The following letters are examples of the letters sent to Native American tribes by the Air Force to initiate government-to-government consultation. The first set of example letters was sent in the fall of 2010. The second set of letters was sent in the fall of 2011. A list of the Native American tribes that have been included in government-to-government consultations is found in Table C–14 along with a compilation of tribal responses. Following the table are copies of the written responses received by the Air Force, in Section C.9.

DEPARTMENT OF THE AIR FORCE
56TH FIGHTER WING (AETC)
LUKE AIR FORCE BASE, ARIZONA 85309-1629

OCT 28 2010

Brigadier General Jerry D. Harris, Jr.
Commander, 56th Fighter Wing
14185 West Falcon Street
Luke AFB AZ 85309-1629

Mr. Louis J. Manuel
Chairman
Ak-Chin Indian Community
42507 West Peters and Nall Road
Maricopa, AZ 85239

Dear Chairman Manuel:

The U.S. Air Force's Air Education and Training Command (AETC) is in the process of preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess potential environmental impacts of basing F-35A Joint Strike Fighter training aircraft at any of the following locations: Luke Air Force Base, Arizona; Tucson International Airport Air National Guard Station, Arizona; Holloman Air Force Base, New Mexico; or Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho.

The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. Alternatives meeting the underlying purpose and need of the proposed action will be developed during the NEPA compliance process. As part of the proposal, the Air Force will analyze the potential environmental effects associated with the following actions at each of the locations identified above:

- Constructing and managing facilities and infrastructure necessary to support the F-35A training program
- Implementing personnel changes (increases or decreases) at the installation to conform with the training program requirements
- Conducting F-35A training activities in Military Operations Areas, Military Training Routes, Air Traffic Control Assigned Airspace, and Restricted Areas associated with air-to-ground ranges emphasizing the multi-role capabilities of the F-35A
- Conducting training activities at outlying airfields
- Employing defensive flare countermeasures in military airspace within which their use is authorized
- Employing F-35A lasers and inert or live munitions at approved military ranges to ensure comprehensive training and public safety
- Performing supersonic training in approved military airspace

The Air Force will also examine a No-Action Alternative that does not beddown F-35A at any of these installations.

The Air Force published a Notice of Intent to prepare an EIS on December 28, 2009, and invited you and/or your representatives to attend scoping meetings which were held at several locations in Arizona. Comments received at those meetings will be addressed in the draft EIS which is currently in preparation. At this time, the Air Force would like to initiate consultation on a government-to-government basis and begin the process of reviewing the basing of the F-35A training program at one of these locations under Section 106 of the *National Historic Preservation Act* and 36 CFR Part 800, *Protection of Historic Properties* and Executive Order 13175. To facilitate this process, the Air Force would like to meet with leaders of tribes (and their designated representatives) that attach cultural importance to places that might be affected by basing the F-35A training program at Luke AFB. I encourage you to take advantage of these meetings to exchange information, ask questions, and advise the Air Force of any concerns you may have about how this proposal might impact the AK-Chin Indian Community and suggestions about ways to avoid or minimize those impacts.

Attached is a map illustrating the airspace and ranges that would be used by an F-35A training program based at Luke AFB (Attachment 1). Please note that the "Occasional Use" airspace and ranges depicted on the map would generally receive only infrequent use by the F-35A.

If you have questions about the NEPA process, please contact Mr. David Martin, AETC F-35A Training EIS Project Manager, at (210) 652-1961. For general questions related to Luke AFB, please contact Mr. James "Rusty" Mitchell, Director, 56th Fighter Wing Community Initiatives Team, at (623) 856-6169, or Mr. Kevin O'Berry, 56th Fighter Wing Native American Liaison, at (623) 856-5857.

I appreciate your continued interest in consulting with the Air Force and the 56th Fighter Wing and look forward to working with the AK-Chin Indian Community in the Section 106 and NEPA processes.

Sincerely,

JERRY D. HARRIS, JR.
Brigadier General, USAF
Commander

Attachment:
1. Map of Proposed Airspace and Ranges for the F-35A Beddown at Luke AFB.

MILITARY DIVISION, STATE OF IDAHO
4040 W. GUARD STREET, BLDG 600
BOISE, IDAHO 83705-5004

C. L. BUTCH OTTER
GOVERNOR

THE ADJUTANT GENERAL
GARY L. SAYLER

November 1, 2010

Billy A. Bell
Chairman
Paiute-Shoshone Tribes
of Fort McDermitt
P.O. Box 457
McDermitt, NV 89421

Dear Chairman Bell:

The U.S. Air Force Air Education and Training Command (AETC) and U.S. Air Force Air Combat Command (ACC) are in the process of preparing two Environmental Impact Statements (EISs) under the National Environmental Policy Act (NEPA) for the beddown of F-35A Joint Strike Fighter aircraft.

One EIS will assess potential environmental impacts of basing F-35A aircraft at training bases: Boise Air Terminal Air Guard Station (Gowen Field), Idaho; Luke Air Force Base, Arizona; Tucson International Airport Air National Guard Station, Arizona; and Holloman Air Force Base, New Mexico.

The other EIS will analyze potential environmental impacts of basing F-35A aircraft at operational bases: Mountain Home Air Force Base (MHAFB), Idaho; Burlington Air Guard Station, Vermont; Hill Air Force Base, Utah; Jacksonville Air Guard Station, Florida; McEntire Joint National Guard Base, South Carolina; and Shaw Air Force Base, South Carolina.

The U.S. Air Force may decide to beddown the F-35A at both Gowen Field and MHAFB, at only one of the installations, or at neither. If chosen as beddown locations, F-35A aircraft would potentially use some of the same ranges and military operations areas for training and operations. Additionally, Gowen Field would use some military training routes for low-level training as depicted on the map at Attachment 1.

In accordance with Executive Order 13175 and Section 106 of the National Historic Preservation Act (NHPA) (36 CFR Parts 800.2, 800.3, and 800.4), the Air Force would like to initiate government-to-government consultation regarding the F-35A beddown proposals. The Air Force desires to discuss the proposal in detail with you and understand and consider any

Please let us know when you would like to meet to discuss the F-35A proposal and your expectations on how we will accomplish the consultations. Do not hesitate to call me at (208) 422-5242 or Colonel Ronald Buckley, 366 Fighter Wing Commander, MHAFB at (208) 828-2366 to arrange dates and times for consultation.

For NEPA process questions, please contact Mr. David Martin, AETC F-35A Training EIS Project Manager, at (210) 652-1961 or Ms. Sheryl Parker, ACC F-35A Operational EIS Project Manager, at (757) 764-9334.

We look forward to working with the Paiute-Shoshone Tribes of Fort McDermitt in the NHPA Section 106 and NEPA processes.

Sincerely,

GARY L. SAYLER
Major General
The Adjutant General, Idaho

RONALD D. BUCKLEY, Colonel, USAF
Wing Commander, 366th Fighter Wing

Attachment :
Map of Proposed Airspace and Ranges for the F-35A Beddown at Boise Air Guard Station and Mountain Home Air Force Base.

DEPARTMENT OF THE AIR FORCE
162D FIGHTER WING (ANG) (AETC)
TUCSON ARIZONA

1 Nov 2010

Colonel Edward P. Maxwell
162nd Fighter Wing
1650 E. Perimeter Way
Tucson, AZ 85706

Mr. Louis Manuel
Chairman
Ak-Chin Indian Community
42507 W. Peters & Nall Rd
Maricopa, AZ 85239

Dear Chairman Manuel:

The U.S. Air Force's Air Education and Training Command (AETC) is in the process of preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess potential environmental impacts of basing F-35A Joint Strike Fighter training aircraft at any of the following locations: Tucson International Airport Air National Guard Station, Arizona; Luke Air Force Base, Arizona; Holloman Air Force Base, New Mexico; or the Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho.

The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. Alternatives meeting the underlying purpose and need of the proposed action will be developed during the NEPA compliance process. As part of the proposal, the Air Force will analyze the potential environmental effects associated with the following actions at each of the locations identified above:

- Constructing and managing facilities and infrastructure necessary to support the F-35A training program
- Implementing personnel changes (increases or decreases) at the installation to conform with the training program requirements
- Conducting F-35A training activities in Military Operations Areas, Military Training Routes, Air Traffic Control Assigned Airspace, and Restricted Areas associated with air-to-ground ranges emphasizing the multi-role capabilities of the F-35A
- Conducting training activities at outlying airfields
- Employing defensive flare countermeasures in military airspace within which their use is authorized
- Employing F-35A lasers and inert or live munitions at approved military ranges to ensure comprehensive training and public safety
- Performing supersonic training in approved military airspace

The Air Force will also examine a No-Action Alternative that does not beddown F-35A at any of these installations.

The Air Force published a Notice of Intent to prepare an EIS on December 28, 2009, and invited you and/or your representatives to attend scoping meetings which were held at several locations in Arizona. Comments received at those meetings will be addressed in the draft EIS which is currently in preparation. At this time, the Air Force would like to initiate consultation on a government-to-government basis and begin the process of reviewing the basing of the F-35A training program at one of these locations under Section 106 of the *National Historic Preservation Act* and 36 CFR Part 800, *Protection of Historic Properties* and Executive Order 13175. To facilitate this process, the Air Force would like to meet with leaders of tribes (and their designated representatives) that attach cultural importance to places that might be affected by basing the F-35A training program at the Tucson International Airport Air National Guard Station. I encourage you to take advantage of these meetings to exchange information, ask questions, and advise the Air Force of any concerns you may have about how this proposal might impact the Hualapai Community and suggestions about ways to avoid or minimize those impacts.

Attached is a map illustrating the airspace and ranges that would be used by an F-35A training program based at Tucson International Airport Air National Guard Station (Attachment 1). Please note that the "Occasional Use" airspace and ranges depicted on the map would generally receive only infrequent use by the F-35A.

If you have questions about the NEPA process, please contact Mr. David Martin, AETC F-35A Training EIS Project Manager, at (210) 652-1961. General questions may be directed to Maj. Gabe Johnson, Public Affairs Officer of the Arizona Air National Guard. Major Johnson can be reached at (520) 295-6192.

I appreciate your continued interest in consulting with the Air Force and the AETC F-35A project and look forward to working with the Hualapai in the NHPA Section 106 and NEPA processes.

Sincerely,

EDWARD P. MAXWELL, Col, AZANG
Commander

Attachment:
1. Map of Airspace and Ranges for the F-35A Beddown at Tucson International Airport Air Guard Station.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

NOV 17 2010

Colonel David A. Krumm
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

President Levi Pesata
Jicarilla Apache Nation
PO Box 507
Dulce NM 87528

Dear President Pesata

The United States Air Force's Air Education and Training Command (AETC) is in the process of preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess potential environmental impacts of basing F-35A Joint Strike Fighter training aircraft at any of the following locations: Holloman Air Force Base, New Mexico; Boise Air Terminal Air Guard Station, also known as Gowen Field, Idaho; Luke Air Force Base, Arizona; or Tucson International Airport Air National Guard Station, Arizona.

The beddown is needed to train pilots and personnel to safely and effectively operate the new F-35A aircraft. Alternatives meeting the underlying purpose and need of the proposed action will be developed during the NEPA compliance process. As part of the proposal, the Air Force will analyze the potential environmental effects associated with the following actions at each of the locations identified above:

- Constructing and managing facilities and infrastructure necessary to support the F-35A Training program
- Implementing personnel changes (increases or decreases) at the installation to conform with the Training program requirements
- Conducting F-35A training activities in Military Operations Areas, military training routes, Air Traffic Control Assigned Airspace, Restricted Areas associated with air-to-ground ranges emphasizing the multi-role capabilities of the F-35A
- Conducting training activities at outlying airfields
- Employing defensive flare countermeasures in military airspace authorized for their use
- Employing F-35A lasers, inert or live munitions at approved military ranges to ensure comprehensive training and public safety
- Performing supersonic training in approved military airspace

Global Power for America

The Air Force will also examine a No-Action alternative that does not beddown the F-35A at any installation.

The Air Force published a Notice of Intent to prepare an EIS on December 28, 2009 and began communications with you through an invitation to the scoping meetings that were held in New Mexico. Now, in accordance with Executive Order 13175 and Section 106 of the National Historic Preservation Act (NHPA) (36 CFR Parts 800.2, 800.3 and 800.4), the Air Force would like to initiate consultation on a government-to-government basis regarding the F-35A proposal.

We have attached a map illustrating the airspace and ranges that would be used for the F-35A proposal at Holloman AFB (Attachment 1). Please note that the "Occasional Use" airspace and ranges depicted on the map would generally receive only infrequent use by the F-35A.

The Air Force desires to initiate government-to-government meetings so you can express your comments, concerns and suggestions. Please let me know when you would like to meet to discuss the F-35A proposal and to plan how our staffs will communicate during the consultations.

For NEPA process questions, please contact Mr. David Martin, AETC F-35A Training EIS Project Manager, at (210) 652-1961. For general questions related to Holloman AFB, please contact Mr. Brent Hunt, 49 CES/CEAO, (575) 572-6678 or Lieutenant Colonel Dawn Hankins, 49 WG/JA, (575) 572-7217.

We appreciate your continued interest in consulting with Holloman AFB and look forward to working with the Jicarilla Apache Nation in the NHPA Section 106 and NEPA processes.

Sincerely

DAVID A. KRUMM
Colonel, USAF
Commander

Attachment:
Map of Proposed Airspace and Ranges for Potential F-35A Beddown at Holloman AFB NM

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

NOV 16 2011

Colonel David A. Krumm
Commander, 49th Wing
490 First Street Suite 1700
Holloman AFB NM 88330-8277

President Mark Chino
Mescalero Apache Tribe
P. O. Box 227
Mescalero NM 88340

Dear President Chino

The Air Force is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess the environmental impacts of basing F-35A aircraft and training at four possible locations: Boise Air Terminal Air Guard Station (AGS), Idaho; Holloman AFB, New Mexico; Luke AFB, Arizona; or Tucson International Airport AGS, Arizona. A no-action alternative to not locate F-35A training at any of these installations will also be examined. Holloman Air Force Base requests Mescalero Apache input regarding this NEPA analysis, and input on any National Historic Preservation Act (NHPA) Section 106 concerns with the proposed basing of F-35A aircraft here. Attachment 1 shows where the F-35A would fly.

Under a recent Finding of No Significant Impact, Holloman is in transition to have F-16s replace the F-22s that have flown here for several years. Similar to the F-16s and F-22s, the F-35A would fly training sorties on low altitude military training routes (MTRs), and at higher altitudes in designated airspace over your lands and most of south central New Mexico. Attachment 2 is a brief recap comparing these aircraft and how they fly. The F-35A EIS will analyze the environmental impacts of the flying and military range use off-base. It will also evaluate the personnel changes, new construction and use of existing facilities on-base, with and without the F-16. We expect the Draft F-35A Training EIS to be released this fall or winter for public comment.

The total Area of Potential Effect (APE) is anywhere in the area under the authorized airspace. For purposes of Section 106 review, the area of potential effect includes the base, any ranges and auxiliary airfields used by aircraft based at Holloman, and properties under the airspace that are listed on the National Register of Historic Places (NRHP) as in Attachment 3. We request your help in identifying and evaluating whether there are any additional significant cultural resources in the area of potential effect.

Global Power for America

The F-35A would fly much of the same area flown by Holloman F-4s, F-15s, F-117s and F-22s over the past 40 years. As a result the F-35A could fly over areas of Mescalero traditional use or cultural importance that are currently unknown to us. If you want to identify such areas please respond by requesting a confidential meeting to discuss appropriate steps the Air Force could take.

My staff will be contacting your office by telephone to discuss the F-35A proposal and expected impacts. For staff questions, comments, or input on the NEPA or NHPA Section 106 review and process, please contact Mr. Andrew Gomolak, Holloman AFB Historic Properties Manager, 575-572-5878, or Mr. Dale Osborn, Community Planner, 575-572-6635.

Please take this opportunity to respond with your preferences selected from (or added to) the list on the endorsement page, Attachment 4. I look forward to receiving any input you may have regarding this endeavor.

Sincerely

DAVID A. KRUMM
Colonel, USAF
Commander

5 Attachments
1. Map of HAFB Based F-35A Airspace
2. Brief comparison of F-16, F-22 and F-35A Aircraft
3. Current list of National Register of Historic Places under proposed F-35A Airspace
4. Response Endorsement and Preferences
5. Stamped, addressed return envelope

Table C–14. Native American Tribal Consultation Letters

Addressee	Date Sent	Response Received	Date Sent	Response Received
Boise AGS	**IICEP Letter**		**Consultation Letter**	
Phillip Del Rosa, Chairman Alturas Rancheria 900 Running Bear Road P.O. Box 340 Alturas, CA 96101	10/26/11		10/26/10 11/04/11	Phone Call: 11/9/11. Called two phone numbers listed for tribe- both lines are disconnected. No other phone number found for tribe.
Dianne Teeman, Chairperson Burns Paiute Tribe 100 Pasiago Street Burns, OR 97720	02/08/10		11/01/10 11/04/11	Phone Calls: 11/9/11, 11/10/11, 11/23/11.
Cherie Rhoades, Chairperson Cedarville Rancheria 300 West 1st Street Alturas, CA 96101	10/26/11		10/26/11 11/04/11	Phone Call: 11/9/11. Contact with Administrative Assistant who was going to update tribal chairperson.
Bernold Pollard, Chairman Fort Bidwell Indian Community P.O. Box 129 Fort Bidwell, CA 96112	10/26/11		10/26/11 11/04/11	Phone Call: 11/9/11. Contact with Administrative Assistant who was going to update tribal chairman.
Billy Bell Fort McDermitt Paiute and Shoshone Tribes P.O. Box 457 McDermitt, NV 89421	02/08/10		11/01/10 11/04/11	Phone Calls: 11/9/11, 11/10/11. No answer and no ability to leave voice mail.
Gary Frost, Chairman Modoc (Klamath Tribes) Klamath General Council P.O. Box 436 Chiloquin, OR 97624-0436	10/26/11		10/26/11 11/04/11	Phone Call: 11/9/11 with Tribal Cultural and Heritage Department Director who indicated the tribes would be concerned over the timing and elevation of the training flights. The tribe would not want the training to affect migration patterns of game animals or disturb ceremonial gatherings. The best time for lower altitude training would be in late Summer or early Fall.
Brooklyn Baptiste, Chairman Nez Perce Tribe P.O. Box 305 Lapwai, ID 83540-0305	10/26/11		10/26/11 11/04/11	Phone Call: 11/9/11. Called office and cell phone numbers of THPO and left message. No response.
Bruce Parry, Chairman Northwestern Band, Shoshone Brigham City Tribal Office 707 North Main Street Brigham City, UT 84302	02/08/10		11/01/10 11/04/11	Phone Call: 11/9/11. 11/21/11 Received e-mail requesting additional information from tribal Cultural Resource Manager. No further response after information provided.
Juan Venegas, Chairperson Pit River Tribe 36970 Park Avenue Burney, CA 96013	10/26/11		10/26/11 11/04/11	Phone Call: 11/9/11 with Tribal Councilman who requested copies of previous sent letters.

Addressee	Date Sent	Response Received	Date Sent	Response Received
Nathan Small, Chairman Shoshone-Bannock Tribes P.O. Box 306 Fort Hall, ID 83203	02/08/10		11/01/10 11/04/11	Phone Call: 11/9/11. Called office and cell phone numbers and left message. No response.
Terry Gibson, Chairman Shoshone-Paiute Tribes of Duck Valley P.O. Box 219 Owyhee, NV 89832	02/08/10		11/01/10 11/04/11	
Warner Barlese, Chairman Summit Lake Paiute Tribe 1708 H Street Sparks, NV 89431	10/26/10		10/26/11 11/04/11	Phone Call: 11/9/11. Called general voicemail for Summit Lake Council and left voicemail on Chairman's Administrative employee. No response.
Holloman AFB	**IICEP Letter**		**Consultation Letter**	
Jeff Houser, Chairman Fort Sill Apache Nation Route 2 Box 121 Apache, OK 73006			11/17/10 11/16/11	Phone Calls: 12/22/11, 01/16/12, 02/27/12, and 04/03/12. Messages left-no response.
Levi Pesata President Gilfford Velarde, THPO Jicarilla Apache Nation P.O. Box 507 Dulce, NM 87528			11/17/10 11/16/11	Phone Calls: 12/5/11, 01/16/12, and 04/03/12. Messages left for THPO.
Mark Chino Frederick Chino Sr. (01/13/12) President Mescalero Apache Tribe P.O. Box 227 Mescalero, NM 88340	03/08/10		11/17/10 11/16/11	Phone Calls: 12/02/10, 04/12/10 (twice), and 09/08/11. No consultation desired.
Henry Kostzuta, Chairman Jerry Suse, THPO Oklahoma Apache Tribe P.O. Box 1220 Anadarko, OK 73005-1220			11/17/10 11/16/11	Phone Calls: 11/21/11, 12/15/11. Chairman indicated No comment.
Ronnie Lupe, Chairman White Mountain Apache Tribe P.O. Box 700 Whiteriver, AZ 86039			11/17/10 11/16/11	Phone Calls: 11/28/11, 12/22/11. No comments or interest in consultation.
Arlen P. Quetawki, Sr., President Darrel Tsapetsaie, THPO Ashiwi Pueblo P.O. Box 339 Zuni, NM 87327	03/08/10		11/17/10 11/16/11	Phone Calls: 11/28/11, 12/22/11. THPO No interest in consultations, call if inadvertent discovery of artifacts.
Johnny Wauqua, Chairman Jimmy Arterberry, CPO Comanche Nation P.O. Box 908 Lawton, OK 73507-0908			11/17/10 11/16/11	Phone Calls: 11/28/11, 12/22/11. Messages left-no response.

Addressee	Date Sent	Response Received	Date Sent	Response Received
Randall Vicente, Governor Haaku Pueblo P.O. Box 309 Acoma, NM 87304	03/08/10		11/17/10 11/16/11	Phone Calls: 11/28/11, 12/22/11. Messages left-no response.
Leroy Shingoitewa, Chairman Leigh Kowanwisiwma, HCPO Hopi Tribe P.O. Box 123 Kykotsmovi, AZ 860039			11/17/10 11/16/11	Written Response "Will Consult" received 12/13/10, 12/05/11 "will comment on Final Draft", 01/30/12 "no further concern unless inadvertent discovery of artifacts, if so call."
Frank Piaz, Governor Isleta del Sur Pueblo P.O. Box 17579 Ysleta Station El Paso, TX 79907			11/17/10 11/16/11	12/06/11, Written response" Will not consult on F-35 EIS, remove from mailing list."
Frank Lujan, Governor Isleta Pueblo P.O. Box 1270 Isleta, NM 87022			11/16/11	Phone Calls: 11/28/11, 12/22/11. Messages left for THPO-no response.
Donald Topfi, Chairman Kiowa Tribe of Oklahoma P.O. Box 369 Carnegie, OK 73015-0369			11/17/10 11/16/11	Phone Calls: 11/28/11, 12/22/11. Messages left for Chairman-no response.
Richard Luarkie, Governor Laguna Pueblo P.O. Box 194 Laguna, NM 87026	03/08/10		11/17/10 11/16/11	Phone Calls: 11/28/11, 12/22/11, and 01/16/12. Messages left for staff-no response.
Scott Apachito, President Alamo Chapter Navajo Alamo Tribe P.O. Box 827 Magdalena, NM 87825	03/08/10		11/17/10 11/16/11	Phone Calls: 11/28/11. Asked for return call in December; 12/22/11 No Answer.
Roger Martinez, President Ramah Navajo Tribe HCR 61, Box 13 Ramah, NM 87321	03/08/10		11/17/10 11/16/11	Phone Calls: 11/28/11, 12/22/11. Unable to complete calls to identified phone number.
Malcolm Montoya, Governor Frank Chaves, Environmental Dept. Sandia Pueblo 481 Sandia Loop Pueblo of Sandia Village Bernalillo, NM 87004			11/16/11	Phone Calls: 11/28/11, 12/22/11. "Want CD only, do not expect any comments."
Robert Ortiz, Governor Tamaya Pueblo 2 Dove Road Pueblo of Santa Ana Bernalillo, NM 87504-5906			11/16/11	Phone Calls: 11/28/11, 12/22/11. Messages left for staff - no response.
Marcellus Medina, Governor Zia Pueblo 135 Capitol Square Zia Pueblo, NM 87053			11/16/11	Phone Calls: 11/28/11, 12/22/11. Messages left for Governor staff and Governor - no response.

Addressee	Date Sent	Response Received	Date Sent	Response Received
Luke AFB/ Tucson AGS	**IICEP Letter**		**Consultation Letter**	
Louis J. Manuel, Jr., Chairman Ak-Chin Indian Community 42507 West Peters and Nall Road Maricopa, AZ 85239	10/28/10		10/28/10 10/06/11 04/23/12	Letter dated 11/14/11. Defers to Salt River (Luke AFB) and Tohono O'Odham Nation (Tucson AGS).
Monique La Chappa, Chairwoman Campo Band of Mission Indians 36190 Church Road, Suite 1 Campo, CA 91906	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	Oral input 04/03/12. Tribe has no specific concerns with the endeavor. Follow up letter from AETC 04/23/12.
Charles Wood, Chairman Chemehuevi Tribe P.O. Box 1976 Havasu Lake, CA 92363	10/28/10		10/28/10 10/06/11 04/23/12	See response from cultural resource staff/THPO.
Sherry Cordova, Chairwoman Cocopah Tribe County 15 and Ave G Somerton, AZ 85350	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.
Eldred Enas, Chairman Colorado River Indian Tribes 26600 Mohave Road Parker, AZ 85344	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.
Clinton Pattea, President Fort McDowell Yavapai Nation P.O. Box 17779 Fountain Hills, AZ 85269	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	
Timothy Williams, Chairman Fort Mojave Indian Tribe 500 Merriman Avenue Needles, CA 92363	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.
Jeff Houser, Chairman Fort Sill Apache Tribe Route 2, Box 121 Apache, OK 73006	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	Oral input 04/03/12. Requested e-mail copy of latest letter to be forwarded to Cultural Affairs office. No further response received.
Keeny Escalanti, Sr., President Fort Yuma-Quechan Tribe P.O. Box 1899 Yuma, AZ 85366	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.
Gregory Mendoza, Governor Gila River Indian Community P.O. Box 97 Sacaton, AZ 85247	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.
Leroy Shingoitewa, Chairman Hopi Tribe P.O. Box 123 Kykotsmovi, AZ 86039	10/28/10		10/28/10 10/06/11 04/23/12	See response from cultural resource staff/THPO.
Louise Benson, Chairwoman Hualapai Tribe P.O. Box 179 Peach Springs, AZ 86434	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	

Addressee	Date Sent	Response Received	Date Sent	Response Received
Manual Savala, Chairman Kaibab Band of Paiute Indians HC 65, Box 2 Fredonia, AZ 86022	10/28/10		10/28/10 10/06/11 04/23/12	Oral input 11/01/11. No impact on the Kaibab Band of Paiute Indians.
Mark Chino, President Mescalero Apache Tribe P.O. Box 227 Mescalero, NM 88340	10/28/10		10/28/10 10/06/11 04/23/12	See response from cultural resource staff/THPO.
Ben Shelley, President Navajo Nation P.O. Box 7440 Window Rock, AZ 86515	10/28/10		10/28/10 10/06/11 04/23/12	See response from cultural resource staff/THPO.
Peter Yucupicio, Chairman Pascua Yaqui Tribe of Arizona 7474 South Camino de Oeste Tucson, AZ 85746	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	
Diane Enos, President Salt River Pima-Maricopa Indian Community 10005 E. Osborn Road Scottsdale, AZ 85256	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.
Terry Rambler, Chairman San Carlos Apache Tribe P.O. Box O San Carlos, AZ 85550	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	Tribal Liaison and 56 FW/CV met with Legislative Council on 05/01/12. No concerns expressed regarding F-35 training basing.
Ned Norris, Chairman Tohono O'odham Nation P.O. Box 837 Sells, AZ 85634	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.
Ivan Smith, Chairman Tonto Apache Tribe Tonto Apache Reservation #30 Payson, AZ 85541	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	Oral input 04/04/12. Vice-chairman Davis stated the tribe had no concerns with the endeavor.
Ronnie Lupe, Chairman White Mountain Apache Tribe P.O. Box 700 Whiteriver, AZ 85941	10/28/10		10/28/10 10/06/11 04/23/12	See response from cultural resource staff/THPO.
David Kwail, Chairman Yavapai-Apache Nation 2400 W. Datsi Camp Verde, AZ 86322	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.
Ernest Jones, Sr., President Yavapai-Prescott Indian Tribe 530 East Merritt Street Prescott, AZ 86301	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.
Arlen Quetawki, Sr., Governor Pueblo of Zuni P.O. Box 339 Zuni, NM 87327	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	See response from cultural resource staff/THPO.

Addressee	Date Sent	Response Received	Date Sent	Response Received
Caroline Antone, Cultural Resource Manager Ak-Chin Him Dak Eco Museum & Archives Ak-Chin Indian Community 47685 N. Eco Museum Road Maricopa, AZ 85239	10/28/10		10/28/10 10/06/11 04/23/12	See response from Chairman.
June Leivas, Director Cultural Resources Center Chemehuevi Tribe P.O. Box 1976 Havasu Lake, CA 92363	10/28/10		10/28/10 10/06/11 04/23/12	Oral input. Chemehuevi had no concerns and would not be providing comments or participating in review of this action.
Jill McCormick, Cultural Resources Manager Cocopah Tribe County 15 and Ave G Somerton, AZ 85350	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	Letter dated 11/07/11. Tribe has no comments. Defers to most local tribes and supports their findings.
Lisa Swick, Director Colorado River Indian Tribal Museum 26600 Mohave Road Parker, AZ 85344	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	Oral input 03/15/12. Indicated DEIS "looked to be in order." No concerns or comments at this time.
Linda Otero, Director AhaMakav Cultural Preservation Office Fort Mojave Indian Tribe P.O. Box 5990 Mojave Valley, AZ 86440	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	Oral input 11/07/11. Probably has no concerns, but will review. No further response.
Bridget Nash-Chrabasz Historic Preservation Officer Fort Yuma-Quechan Tribe P.O. Box 1899 Yuma, AZ 85366	10/28/10	Letter dated 02/22/10. Defers comment to O'odham.	10/28/10 10/06/11 02/14/12 04/23/12	Phone Call: With new staff (John Bathke) produced no further input.
Leigh Kuwanwisiwma, Director Hopi Cultural Preservation Office Hopi Tribe P.O. Box 123 Kykotsmovi, AZ 86039	10/28/10		10/28/10 10/06/11 04/23/12	Letter dated 01/30/12. No concerns at this time. Requests additional consultation if prehistoric cultural resources will be affected by ground-disturbing activities.
Loretta Jackson-Kelly Tribal Historic Preservation Officer Office of Cultural Resources Hualapai Tribe P.O. Box 310 Peach Springs, AZ 86434	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	
Charley Bullets, Director Cultural Resources Office Kaibab Band of Paiute Indians HC 65, Box 2 Fredonia, AZ 86022	10/28/10		10/28/10 10/06/11	See response from Chairman.

Addressee	Date Sent	Response Received	Date Sent	Response Received
Shane Anton Cultural Preservation Program Supervisor Cultural & Environmental Services Salt River Pima-Maricopa Indian Community 10005 E. Osborn Road Scottsdale, AZ 85256	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	Oral input 11/07/11. Salt River defer to other, more likely affected tribes, but would like to participate in any meetings or field visits and continue to be included in consultation. Will inform Air Force of any concerns. No further response.
Christopher Coder, Archaeologist Cultural Resources Yavapai-Apache Nation 2400 W. Datsi Camp Verde, AZ 86322	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	E-mail 03/20/12 indicates Yavapai-Apache has no concerns about this action.
Greg Glassco, Compliance Officer Cultural Research Department Yavapai-Prescott Indian Tribe 530 East Merritt Prescott, AZ 86301	10/28/10		10/28/10 10/06/11 02/14/12 04/23/12	E-mail 04/05/12 indicates tribe has no comments. Requests notification if Luke AFB is selected in ROD.
Barnaby Lewis Tribal Historic Preservation Officer Gila River Indian Community P.O. Box 2140 Sacaton, AZ 85247	10/28/10		10/28/10 10/06/11 02/14/12	Letter dated 02/07/12. Document is acceptable, defers to Tohono O'Odham Nation as lead in the consultation process.
Holly Houghten Tribal Historic Preservation Officer Mescalero Apache Tribe P.O. Box 227 Mescalero, NM 88340	10/28/10		10/28/10 10/06/11	Oral input 11/04/11. Mescalero has no concerns about overflights.
Alan Downer Tribal Historic Preservation Officer Historic Preservation Department Navajo Nation P.O. Box 4950 Window Rock, AZ 86515	10/28/10		10/28/10 10/06/11	Oral input 11/07/11. Undertaking will not affect Navajo traditional cultural resources, and Navajo Nation has no comments at this time. Requests information about any inadvertent discoveries made later.
Vernelda Grant Tribal Historic Preservation Officer Historic Preservation and Archaeology Department San Carlos Apache Tribe P.O. Box O San Carlos, AZ 85550	10/28/10		10/28/10 10/06/11 02/14/12	Oral input 11/08/11. Probably would have no comments, but would most likely defer to Tohono O'Odham.
Peter Steere Tribal Historic Preservation Officer Cultural Affairs Department Tohono O'odham Nation P.O. Box 837 Sells, AZ 85634	10/28/10		10/28/10 10/06/11 02/14/12	Letter dated 04/12/10. Requests specific information on Verbal input, 03/07/12. No concerns about historic properties, but again requests information on noise. No additional input.

Addressee	Date Sent	Response Received	Date Sent	Response Received
Mark Altaha Tribal Historic Preservation Officer Heritage Program White Mountain Apache Tribe P.O. Box 507 Ft. Apache, AZ 85926	10/28/10		10/28/10 10/06/11 02/14/12	Letter dated 01/23/12. Project will not have an adverse effect on the White Mountain Apache tribe's historic properties and/or traditional cultural resources. Contact if affiliated cultural resources are discovered in the implementation of this project.
Kurt Dongoske Tribal Historic Preservation Officer Zuni Heritage and Historic Preservation Office Pueblo of Zuni P.O. Box 339 Zuni, NM 87327	10/28/10		10/28/10 10/06/11 02/14/12	Oral input at meeting 11/10/11. Zuni cultural advisors indicated White Mountain Apache Tribe should be consulted. Subsequently, WMAT THPO sent written comments stating that no historic properties or traditional cultural resources would be adversely affected. On this basis, Zuni THPO indicated tribe has no concerns.

C.9 Tribal Response Letters

The following letters were received by the Air Force in response to the IICEP letters and to the letters sent to initiate government-to-government consultations with identified Native American tribes.

QUECHAN INDIAN TRIBE
Ft. Yuma Indian Reservation

P.O. Box 1899
Yuma, Arizona 85366-1899
Phone (760) 572-0213
Fax (760) 572-2102

February 22, 2010

HQ AETC/A7C
Attn: Mr. David Martin, AETC NEPA Program Manager
266 F Street West
Randolph Air Force Base, TX 78150-4319

Dear Mr. Martin,

Thank you for notifying us of the proposed basing of F-35A Joint Strike Fighters at Luke Air Force Base, AZ and Tucson International Airport Air National Guard Base, AZ.

While the Cultural Committee expressed concerns over impacts to cultural resources in the areas of the proposed activities, they are deferring comment on these projects to the Hi-Ced and Tohono O'odham as the projects are within their traditional land area. The Committee will support whatever the Tribes decide in regards to the aforementioned activities.

Again, we thank you for your notification. If you need any further information or have any questions, please contact me at (760) 572-2423.

Sincerely,

Bridget R. Nash-Chrabascz
Historic Preservation Officer

TOHONO O'ODHAM NATION
CULTURAL AFFAIRS PROGRAM
P.O. BOX 837 • SELLS, ARIZONA 85634
Telephone (520) 383-3622 • Fax (520) 383-3377

April 12, 2010

Kurt F. Neubauer
Brigadier General, USAF
Commander, 56th Fighter Wing
14185 West Falcon Street
Luke AFB, Arizona 85309-1269

Dear General Neubauer:

Thank you for consulting with the Tohono O'odham Nation regarding the environmental impacts of basing F-35A Joint Strike Fighter Training Aircraft at Luke Air Force Base, Arizona or at the Tucson International Airport Air National Guard Base, Arizona.

The Cultural Affairs Office has the following concerns and comments:

1. The United States Air Force should schedule a scoping meeting on the Tohono O'odham Nation
2. If the F-35A aircraft are stationed at Luke Air Force Base or at the Air National Guard Base at Tucson International Airport – will they be flying routes over the Tohono O'odham Nation ?
3. What will be the routes selected for training and the relationship between units stationed at Luke Air Force Base or Tucson International Airport and the Barry Goldwater Range that is located west of the Tohono O'odham Nation ?
4. Can you provide the Tohono O'odham Nation with studies on the noise issues of the F-35A aircraft ?

Thank you for the opportunity to comment.

Sincerely,

Peter L. Steere
Tribal historic Preservation Officer

THE HOPI TRIBE

LeRoy N. Shingoitewa
CHAIRMAN

Herman G. Honanie
VICE-CHAIRMAN

December 13, 2010

Colonel David A. Krumm, Commander
Department of the Air Force, Headquarters 49th Wing
490 First Street, Suite 1700
Holloman Air Force Base, New Mexico 88330-8277

Dear Colonel Krumm,

This letter is in response to your correspondence dated November 17, 2010, regarding basing F-35A Joint Strike Fighter at Holloman Air Force Base, or other bases in Arizona and New Mexico. Because the Hopi Tribe claims cultural affiliation to the prehistoric cultural groups in Arizona and New Mexico, and the Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites, we appreciate the your continuing solicitation of our input and your efforts to address our concerns.

The Hopi Cultural Preservation Office considers the prehistoric archaeological sites of our ancestors to be Traditional Cultural Properties. We understand constructing facilities and infrastructure necessary to support the F-35A training program for each of the locations will be analyzed in an Environmental Impact Statement. Because this proposal involves ground disturbing activities, if cultural resources surveys identify National Register eligible prehistoric sites that will be adversely affected by project activities, please provide us with copies of the cultural resources survey report and any proposed treatment plans for review and comment.

In addition, we recommend that if any cultural features or deposits are encountered during project activities, these activities must be discontinued in the immediate area of the remains, and the State Historic Preservation Office must be consulted to evaluate their nature and significance. If any Native American human remains or funerary objects are discovered during construction they shall be immediately reported as required by law.

If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619 or tmorgart@hopi.nsn.us. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

xc: New Mexico State Historic Preservation Office

P.O. BOX 123 KYKOTSMOVI, AZ 86039 (928) 734-3000

THE HOPI TRIBE

LeRoy N. Shingoitewa
CHAIRMAN

Herman G. Honanie
VICE-CHAIRMAN

28 OCT 11

October 17, 2011

Brigadier General Jerry D. Harris, Jr., Commander
Attention: Carol Heathington, Environmental Planner
Department of the Air Force, 56th Fighter Wing (AETC)
14185 West Flacon Street
Luke Air Force Base, Arizona 85309-1629

Dear General Harris,

This letter is in response to your correspondence dated October 6, 2011, regarding basing F-35A Joint Strike Fighter Training at Luke Air Force Base, Tucson Air Guard Station, or other bases in Arizona and New Mexico. Because the Hopi Tribe claims cultural affiliation to the prehistoric cultural groups in Arizona and New Mexico, and the Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites, we appreciate the your continuing solicitation of our input and your efforts to address our concerns.

The Hopi Cultural Preservation Office considers the prehistoric archaeological sites of our ancestors to be Traditional Cultural Properties. In our enclosed letter dated November 29, 2010, we stated we understood constructing facilities and infrastructure necessary to support the F-35A training program for each of the locations will be analyzed in an Environmental Impact Statement. Because this proposal involves ground disturbing activities, if cultural resources surveys identify National Register eligible prehistoric sites that will be adversely affected by project activities, we requested to be provided with copies of the cultural resources survey report and any proposed treatment plans for review and comment.

We have reviewed the enclosed list of National Register properties located in areas that may be affected by this proposal that includes Tonto National Monument and Gila Pueblo. Therefore, because we request consultation on any proposal that has the potential to adversely affect prehistoric cultural resources on Luke Air Force Base, we look forward to continuing consultation on this proposal, and reiterate our request that if prehistoric cultural resources will be adversely affected by project activities to be provided with copies of the cultural resources survey report and any proposed treatment plans for review and comment.

If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619 or tmorgart@hopi.nsn.us. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

Enclosure: November 29, 2010, letter to Luke AFB
xc: Arizona State Historic Preservation Office

P.O. BOX 123 KYKOTSMOVI, AZ 86039 (928) 734-3000

GILA RIVER INDIAN COMMUNITY
POST OFFICE BOX 2140, SACATON, AZ 85147

TRIBAL HISTORIC PRESERVATION OFFICE
(520) 562-7162
Fax: (520) 562-5083

November 4, 2011

Brigadier General Jerry D. Harris, Jr.
Commander, 56th Fighter Wing
14185 West Falcon Street
Luke AFB AZ 85309-1629

RE: Section 106 Review Proposed F-35A Joint Strike Fighter Training Luke Air Force Base or Tucson Air Guard Station, Arizona.

Dear General Harris,

The Gila River Indian Community Tribal Historic Preservation Office (GRIC-THPO) has received your consultation document dated October 6, 2011. The letter describes a Luke Air Force Base 56th Fighter Wing (LAFB 56 FW) undertaking to deploy new F-35A fighter aircraft at either Luke Air Force Base or Tucson Air Guard Station. The Barry M. Goldwater Range (BMGR) East will be used as the pilot training range. The GRIC-THPO initially responded to this undertaking on December 16, 2010. A draft Environmental Impact Statement (EIS) will be released for review in "the fall or winter."

The GRIC-THPO will provide comments once we have received and reviewed the draft EIS. The proposed project area is within the ancestral lands of the Four Southern Tribes (Gila River Indian Community; Salt River Pima-Maricopa Indian Community; Ak-Chin Indian Community and the Tohono O'Odham Nation. We would normally defer to the Tohono O'Odham Nation as lead in the consultation process. However, since this response does not yet require a consultation response, deferral is not necessary. Contacting our office to discuss this undertaking would be appropriate and we look forward to those discussions.

Thank you for continued consultation with the GRIC-THPO on this project. If you have any questions please do not hesitate to contact me or Archaeological Compliance Specialist Larry Benallie, Jr. at 520-562-7162.

Respectfully,

Barnaby V. Lewis
Tribal Historic Preservation Officer
Gila River Indian Community

THE COCOPAH INDIAN TRIBE
Cultural Resource Department
14515 S. Veterans' Drive
Somerton, Arizona 85350-2689
Telephone (928) 627-4849
Cell (928)503-2291
Fax (928) 627-3173

CCR-015-11-003

November 7, 2011

Carol Heathington
Historic Preservation Officer
56th Range Management Office
7224 North 139th Drive
Luke AFB, AZ 85309

RE: Proposed Basing of F-35A Joint Strike Fighter Training at Luke Air Force Base or Tucson Air Guard Station, Arizona

Dear Ms. Heathington:

The Cultural Resources Department of the Cocopah Indian Tribe appreciates your consultation efforts on this project. We are pleased that you contacted our department on this issue for the purpose of solicitation of our input and to address our concerns on this matter. However, at this time we wish to make no comments on the development of the project. We defer the decision making process regarding the sensitive cultural resources of the area to the most local tribe(s) and support their determinations on these issues. However, we would like to continue to be kept informed on the situation and be a part of the consultation process in the future.

If you have any questions or need additional information please feel free to contact the cultural resource department. We will be happy to assist you with any future concerns or questions.

Sincerely,

Lt. Jill McCormick, M.A.
Cultural Resource Manager

THE NAVAJO NATION

Historic Preservation Department, POB 4950, Window Rock, AZ 86515 • PH: 928.871-7198 • FAX: 928.871.7886

BEN SHELLY
PRESIDENT

REX LEE JIM
VICE-PRESIDENT

November 7, 2011

Brigadier General, USAF
Jerry D. Harris, JR.
Commander, 56th Fighter Wing
14185 West Falcon Street
Luke AFB AZ 85309-1629

Dear Brigadier General Harris:

The Navajo Nation Historic Preservation Department-Traditional Culture Program (NNHPD-TCP) is in receipt of the proposed project regarding a Proposed Basing of F-35A Joint Strike Fighter Training at Luke Air Force Base or Tucson Air Guard Station, Arizona.

After reviewing your consultation documents, NNHPD-TCP has concluded the proposed undertaking/project area **will not impact** Navajo traditional cultural resources. The NNHPD-TCP, on behalf of the Navajo Nation has no concerns at this time.

However, the determination made by the NNHPD-TCP does not necessarily mean that the Navajo Nation has no interest or concerns with the proposed project. If the proposed project inadvertently discovers habitation sites, plant gathering areas, human remains and objects of cultural patrimony, the NNHPD-TCP request that we be notified respectively in accordance with the Native American Graves Protection and Repatriation Act NAGPRA).

The NNHPD-TCP appreciates the Luke Air Force Base's consultation efforts, pursuant to 36 CFR Pt. 800.1 (c)(2)(iii). Should you have any additional concerns and/or questions, do not hesitate to contact me electronically at tony@navajohistoricpreservation.org or telephone at 928-871-7750.

Sincerely,

Tony H. Joe, Jr., Supervisory Anthropologist (Section 106 Consultations)
Historic Preservation Department-Traditional Culture Program

TCP

AK-CHIN INDIAN COMMUNITY
Community Government
42507 W. Peters & Nall Road • Maricopa, Arizona 85138 • Telephone: (520) 568-1000 • Fax: (520) 568-1001

November 14, 2011

Kevin O'Berry
Luke AFB Native American Liaison
Department of the Air Force
Air Education & Training Command
14185 West Falcon Street
Luke AFB, AZ 85309-1629

Re: **Section 106 Review of Proposed Basing of F-35A Joint Strike Fighter Training at Luke Air Force Base or Tucson Air Guard Station, Arizona**

Dear Mr.O'Berry:

The Ak-Chin Indian Community did receive your notice regarding the proposed basing of F-35A training at one or more of four alternative locations, including Luke AFB, Arizona and Tucson International Airport AGS, Arizona.

Based on the locations of this proposed project, the Ak-Chin Indian Community does not have any comments. We will defer any concerns for the Luke AFB location to the Salt River Pima-Maricopa Indian Community, Preservation Office, Scottsdale, AZ and defer concerns for the Tucson International Airport AGS location to the Tohono O'Odham Nation, Tribal Historic Preservation Office, Sells, AZ.

Thank you for informing the Ak-Chin Indian Community about this project. If you should have any questions, please contact Mrs. Caroline Antone, Cultural Resources Manager at (520) 568-1372 or Mr. Gary Gilbert, Technician II at (520) 568-1369.

Sincerely,

Louis J. Manuel Jr., Chairman
Ak-Chin Indian Community

THE HOPI TRIBE

LeRoy N. Shingoitewa
CHAIRMAN

Herman G. Honanie
VICE-CHAIRMAN

December 5, 2011

Colonel David A. Krumm, Commander
Attention: Andrew Gomolak, Historic Properties Manager
Department of the Air Force, Headquarters 49th Wing (ACC)
49 CES/CEA, 550 Tabosa Ave.
Holloman Air Force Base, New Mexico 88330-8458

Dear Colonel Krumm,

This letter is in response to your correspondence dated November 16, 2011, regarding basing F-35A Joint Strike Fighter Training at Holloman Air Force Base or other bases in Arizona and New Mexico. Because the Hopi Tribe claims cultural affiliation to the prehistoric cultural groups in Arizona and New Mexico, and the Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites, we appreciate the your continuing solicitation of our input and your efforts to address our concerns.

The Hopi Cultural Preservation Office considers the prehistoric archaeological sites of our ancestors to be Traditional Cultural Properties. In our enclosed letter dated December 13, 2010, we stated we understood constructing facilities and infrastructure necessary to support the F-35A training program for each of the locations will be analyzed in an Environmental Impact Statement. Because this proposal involves ground disturbing activities, if cultural resources surveys identify National Register eligible prehistoric sites that will be adversely affected by project activities, we requested to be provided with copies of the cultural resources survey report and any proposed treatment plans for review and comment.

We have reviewed the enclosed list of National Register properties located in areas that may be affected by this proposal that includes Salinas Pueblo Missions National Monument. Therefore, because we request consultation on any proposal that has the potential to adversely affect prehistoric cultural resources on Holloman Air Force Base, we look forward to continuing consultation on this proposal, and reiterate our request that if prehistoric cultural resources will be adversely affected by project activities to be provided with copies of the cultural resources survey report and any proposed treatment plans for review and comment.

If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619 or tmorgart@hopi.nsn.us. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

Enclosure: December 13, 2010, letter to Holloman AFB
xc: New Mexico State Historic Preservation Office

P.O. BOX 123 KYKOTSMOVI, AZ 86039 (928) 734-3000

F-35A Training Environmental Impact Statement consultation with Holloman Air Force Base Endorsement and Response

(Note to Tribes & Pueblos: If you are not preparing some other response, please take a few minutes to let us know your desires for more or less contact about locating and flying the F-35A at Holloman AFB, New Mexico. Please mail this back in the stamped envelope we sent.)

From the Isleta del Sur Pueblo, Governor Paiz or staff

JAVIER LOERA — TRIBAL HISTORIC PRESERVATION OFFICER / THPO

Javier Loera — WAR CAPTAIN — 12-06-11

Responders name — Title — Date

Please remove Isleta del Sur Pueblo from the consulting list for this F-35A project (YES) NO
(Note: The pueblo can re-enter the F-35A at Holloman discussion by request at any time.)

Please call ___-___-_____ and ask for _____ to make arrangements for the Holloman Commander to attend government to government consultation.

Please have Holloman staff call ___-___-_____ and ask for _____
to discuss _____

Isleta del Sur will provide input on National Register sites potentially affected by the F-35A YES (NO)

Isleta del Sur Pueblo will provide input on Traditional Cultural Properties that could be affected by flight of the F-35A in the areas shown on the maps the AF provided YES (NO)

Please send Isleta del Sur the Draft Environmental Impact Statement (EIS) YES (NO)

If yes, please send the EIS to the attention of _____

The Isleta del Sur Pueblo intends to prepare and send written comments YES (NO)

OTHER COMMENTS _____

THE HOPI TRIBE

LeRoy N. Shingoitewa
CHAIRMAN

Herman G. Honanie
VICE-CHAIRMAN

January 30, 2012

Colonel David F. DeMartino, The Civil Engineer
Department of the Air Force, Air Education and Training Command
266 F Street West
Randolph AFB, TX 78150-4319

Dear Colonel DeMartino,

This letter is in response to your correspondence dated January 12, 2012, regarding an enclosed Draft Environmental Impact Statement to establish a Pilot Training Center for basing F-35A Joint Strike Fighter Training at Luke or Holloman Air Force Bases or other bases in Arizona and New Mexico. The Hopi Tribe claims cultural affiliation to the prehistoric cultural groups in Arizona and New Mexico. The Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites, and we consider the prehistoric archaeological sites of our ancestors to be "footprints" and Traditional Cultural Properties. Therefore, we request consultation on any proposal that has the potential to adversely affect prehistoric cultural resources in Arizona and New Mexico, and therefore, we appreciate the Department of the Air Force's continuing solicitation of our input and your efforts to address our concerns.

In our letters to Holloman Air Force Base dated December 13, 2010, and December 5, 2011, and to Luke Air Force Base dated November 29, 2010 and October 17, 2011, we stated we understood constructing facilities and infrastructure necessary to support the F-35A training program for each of the locations will be analyzed in an Environmental Impact Statement. We have reviewed the lists of National Register properties located in areas that may be affected by the Holloman proposal that includes Salinas Pueblo Missions National Monument, and by the Luke proposal that includes Tonto National Monument and Gila Pueblo.

We have now reviewed the enclosed Draft Environmental Impact Statement. Regarding Holloman Air Force Base, we understand that although surveys have documented 250 archaeological resources in the main area, none are within any of the proposed construction projects. Regarding Luke Air Force Base and Tucson International Airport Air Guard Station, we understand impacts on archaeological resources are also not expected.

Therefore, unless prehistoric cultural resources are inadvertently discovered, we defer further consultation on establishing a Pilot Training Center for basing F-35A Joint Strike Fighter Training to the State Historic Preservation Offices and other interested tribes and parties.

If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619 or tmorgart@hopi.nsn.us. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

xc: New Mexico and Arizona State Historic Preservation Offices
HQ AETC/A7CPP, David Martin, Air Force Contractor and Kim Fornof, 266 F Street West, Building 901, Randolph AFB, TX 78150-4319
Colonel David A. Krumm, Andrew Gomolak, DOAF, Headquarters 49th Wing (ACC), 49 CES/CEA, 550 Tabosa Ave., Holloman Air Force Base, New Mexico 88330-8458
Brigadier General Jerry D. Harris, Jr., Carol Heathington, DOAF, 56th Fighter Wing (AETC), 14185 West Flacon Street, Luke Air Force Base, Arizona 85309-1629

White Mountain Apache Tribe
Office of Historic Preservation
PO Box 507
Fort Apache, AZ 85926
Ph: (928) 338-3033 Fax: (928) 338-6055

To: Kevin O'Berry, Luke AFB and Tucson AGS Tribal Liaison

Date: January 23, 2012

Project: Draft EIS to establish a Pilot Training Center and basing of 144 F-35A.

The White Mountain Apache Tribe Historic Preservation Office appreciates receiving information on the proposed project, December 12, 2011. In regards to this, please attend to the following checked items below.

► ***There is no need to send additional information unless project planning or implementation results in the discovery of sites and/or items having known or suspected Apache Cultural affiliation.***

► Please refer to the attached additional notes in regards to the proposed project:

We have received and reviewed information regarding the Draft EIS for the proposed Pilot Training Center and the placement of 144 F-35A at various existing Air Force and Air Guard installations, and we have determined that proposed projects ***will not have an adverse effect*** on the White Mountain Apache tribe's (WMAT) historic properties and/or traditional cultural resources. Regardless, we recommend any/all ground disturbing activities be monitored ***if*** there are reasons to believe that there are human remains and/or funerary objects are present, and if such remains and/or objects are encountered all project activities should cease and the proper authorities and/or ***affiliated*** *tribe(s)* be notified to evaluate the situation.

Thank you. We look forward to continued collaborations in the protection and preservation of place of cultural and historical significance.

Sincerely,

Mark T. Altaha

White Mountain Apache Tribe

Historic Preservation Office

GILA RIVER INDIAN COMMUNITY
POST OFFICE BOX 2140, SACATON, AZ 85147

TRIBAL HISTORIC PRESERVATION OFFICE
(520) 562-7162
Fax: (520) 562-5083

February 7, 2012

Colonel David E. DeMartino
The Civil Engineer
266 F Street West
Randolph AFB, Texas 78150-4319

RE: Section 106 Review Proposed F-35A Joint Strike Fighter Training Luke Air Force Base or Tucson Air Guard Station, Arizona.

Dear Colonel DeMartino,

The Gila River Indian Community Tribal Historic Preservation Office (GRIC-THPO) has received your consultation package and draft Environmental Impact Statement (EIS) dated January 12, 2012. The draft EIS evaluates the environmental impacts to the natural and cultural landscapes as a result of basing F-35A fighter aircraft at either Boise, Idaho; Tucson, Arizona; Alamogordo, New Mexico; or at Luke Air Force Base (Luke AFB) in Phoenix, Arizona. Evaluations for basing 24, 48, 72, 96, and 120 F-35A fighters at Luke AFB have been completed. Noise levels generated by F-35A training at Luke AFB would adversely effect the exposed population. Aircraft from Luke AFB are expected to train within the airspace of the Barry M. Goldwater Range East (BMGR East) south of Gila Bend, Arizona. Access to airspace over the BMGR East will have no impacts to the Gila River Indian Community as no over flights of the GRIC are expected to occur. Training flights will primarily be conducted at higher altitudes (10,000 feet). The GRIC-THPO initially responded to this undertaking on December 16, 2010.

The GRIC-THPO has reviewed the draft EIS and the document appears to be acceptable. The EIS primarily focuses on impacts at Luke Air Force Base only. This includes construction and expansion of buildings, depending upon the number of aircraft and support staff necessary to operate a viable United States Air Force fighter command. Training flights over the BMGR East are described in the EIS as less intrusive because of higher flight altitudes, but the GRIC-THPO still has concerns about disturbance to raptors and other wildlife in the area in the training area. Observation of wildlife behavior during over flights would be most enlightening in measuring the kind of impacts one could reasonably expect. While jet crashes are uncommon and certainly unfortunate, nonetheless, there is little provision provided in the EIS providing guidelines about recovery procedures. What kinds of effects to cultural resources could potentially occur as a result of aircraft recovery procedures? Would archaeological monitors be required during recovery operations? Addressing these issues is no doubt a long term process and the GRIC-THPO looks forward to continued consultation with Luke AFB for the foreseeable future.

The proposed project area is within the ancestral lands of the Four Southern Tribes (Gila River Indian Community; Salt River Pima-Maricopa Indian Community; Ak-Chin Indian Community and the Tohono O'Odham Nation. The GRIC-THPO defers to the Tohono O'Odham Nation as lead in the consultation process.

We would like to reiterate that contacting our office to discuss this undertaking is always appropriate and we thank you for continued consultation with the GRIC-THPO. If you have any questions please do not hesitate to contact me or Archaeological Compliance Specialist Larry Benallie, Jr. at 520-562-7162.

Respectfully,

Barnaby V. Lewis
Tribal Historic Preservation Officer
Gila River Indian Community

THE
NAVAJO
NATION

Historic Preservation Department, POB 4950, Window Rock, AZ 86515 • PH: 928.871-7198 • FAX: 928.871.7886

BEN SHELLY
PRESIDENT

REX LEE JIM
VICE-PRESIDENT

March 20, 2012

David F. DeMartino
Colonel, USAF
Department of the Air Force
HQ AETC/A7C
266 F Street W., Building 901
Randolph AFB TX 78150

Dear Mr. DeMartino:

The Historic Preservation Department-Traditional Culture Program (HPD-TCP) is in receipt of the proposed project regarding the F-35A Training Basing Draft Environmental Impact Statement.

After reviewing your consultation documents, HPD-TCP has concluded the proposed undertaking/project area **will not impact** Navajo traditional cultural resources. The HPD-TCP, on behalf of the Navajo Nation has no concerns at this time.

However, the determination made by the HPD-TCP does not necessarily mean that the Navajo Nation has no interest or concerns with the proposed project. *If the proposed project inadvertently discovers habitation sites, plant gathering areas, human remains and objects of cultural patrimony, the HPD-TCP request that we be notified respectively in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA).*

The HPD-TCP appreciates the Department of the Air Force's consultation efforts, pursuant to 36 CFR Pt. 800.1 (c)(2)(iii). Should you have any additional concerns and/or questions do not hesitate to contact me electronically at tony@navajohistoricpreservation.org or telephone at 928-871-7750.

Sincerely,

Tony H. Joe, Jr., Supervisory Anthropologist (Section 106 Consultations)

C.10 Section 7 Informal Consultation with U.S. Fish and Wildlife Service

A biological evaluation (BE) was prepared to initiate Section 7 informal consultation with the U.S. Fish and Wildlife Service (USFWS). The BE described the potential impacts of the Preferred Alternative, Scenario L3 at Luke AFB, and presented a "may affect, not likely to adversely affect," determination. The BE was submitted to the USFWS in Arizona and New Mexico on October 19, 2011 (see letters below). The USFWS responded with a letter on November 25, 2011, with comments on the BE. A revised BE was submitted on March 28, 2012, in order to address the comments from USFWS and to evaluate the full complement of F-35A aircraft that could be beddown at Luke AFB (Scenario L6). The USFWS concurred with the BE's determination of "may affect, not likely to adversely affect" in a letter dated April 26, 2012. No further action is required and Section 7 informal consultation has been completed for this Proposed Action.

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Colonel David F. DeMartino, USAF
The Civil Engineer
Directorate of Logistics, Installations and Mission Support
Headquarters Air Education and Training Command
266 F Street West
Randolph AFB TX 78150-4319

U.S. Fish and Wildlife Service
Arizona Ecological Services Office
Mr. Stephen L. Spangle, Field Supervisor
2321 West Royal Palm Road, Suite 103
Phoenix, AZ 85021-4951

RE: Transmittal of A Biological Evaluation (BE) and Request For Concurrence With A May Affect, but is Not Likely To Adversely Affect Determination With Regard To Species Listed Or Proposed For Listing As Endangered Or Threatened Under The Endangered Species Act (ESA)

Dear Mr. Spangle

The attached Biological Evaluation (BE) addresses the United States Air Force (Air Force) Headquarters Air Education and Training Command (HQ AETC) proposal to base a Pilot Training Center with F-35A strike aircraft at Luke AFB, Arizona within FWS Region 2. The BE addresses the potential for project actions to affect species listed or proposed for listing as endangered or threatened under the Endangered Species Act (ESA). Focusing on species that could be affected by training activities within the airspace or by construction and operations at Luke AFB, the BE concludes that the proposed action **may affect, but is not likely to adversely affect** listed or proposed species **and would not adversely modify any critical habitat**. The Air Force is seeking USFWSs concurrence with this determination in compliance with the ESA.

The proposed project involves basing 72 F-35A training aircraft at Luke AFB. When the 72 F-35As are combined with the retirement or relocation of 142 AETC F-16 aircraft, the total number of airfield operations conducted at Luke AFB and activities within most associated airspace units would decrease.

Summary of Potential Effects: Proposed facility construction, renovation, and/or demolition would occur in previously disturbed areas at Luke AFB. Operations at Luke AFB for the F-35A would include mission and training programs similar to those conducted with the existing aircraft. No federally listed, proposed, or candidate species are known or expected to occur at Luke AFB; therefore, no adverse effects are anticipated from construction or operations there.

All F-35A flight activities would occur in existing airspace; therefore, no airspace modifications would be required. F-35A activities on training ranges and in the airspace would be similar to those of the F-16s, which would be replaced by the F-35As. Due to the F-35A conducting proportionately more sorties at higher altitudes than the F-16, the potential to startle wildlife from the noise and sudden appearance of overflying aircraft would be reduced. Only 15 percent of F-35A flight hours would be below 10,000 feet Above Ground Level (AGL), whereas 96 percent and 56 percent of the flight hours of A-10s and F-16s, respectively, are spent below 10,000 feet. Guided munitions used for training with the F-35A would be expected to be released from higher altitudes than conventional munitions employed by aircraft currently using the training ranges. Munitions use would be confined to existing target areas within existing restricted airspace. The F-35A would conduct supersonic training only in airspace units and at altitudes that are currently authorized for supersonic training. No supersonic flight would be authorized on Military Training Routes (MTRs). Sonic booms generated by F-35A aircraft would be expected to be similar in terms of overpressure and frequency of boom events per sortie to sonic booms generated by F-16 aircraft. The addition of F-35A supersonic operations would be offset by decreases in F-16 supersonic operations. Overall noise levels and the projected average number of sonic booms per day would decrease under the Proposed Action beneath all primary training airspace units and would range from one to two booms per day or less, depending on the location.

Potential adverse effects on eight endangered, threatened, proposed, or candidate species known are known to occur or that may occur under airspace proposed for project use are specifically addressed in the attached BE. These species include the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Sonoran pronghorn (*Antilocapra americana sonoriensis*), Southwestern willow flycatcher (*Empidonax traillii extimus*), Mexican spotted owl (*Strix occidentalis lucida*), Sonoran Desert population of the bald eagle (*Haliaeetus leucocephalus*), masked bobwhite (*Colinus virginianus ridgewayi*), Yuma clapper rail (*Rallus longirostris yumanensis*), mountain plover (*Charadrius montanus*), western DPS of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and Sonoran (Morafka's) desert tortoise (*Gopherus agassizii/Gopherus morafkai*).

The analysis concludes that any response to overflight or sonic boom would be temporary and not reach the scale at which "take" occurs (as defined in the ESA) and that the probability of a bird-aircraft strike involving injury to a listed, proposed, or candidate species is so low as to be discountable. Therefore, it is concluded that the project **may affect, but is not likely to adversely affect** listed or proposed species **and would not adversely modify any critical habitat**. We request USFWS written concurrence with this determination in compliance with the ESA.

DEMARTINO.DAV
ID.F.1048930243

DAVID F. DeMARTINO, Colonel, USAF, P.E.
The Civil Engineer

Attachment: Biological Evaluation

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Colonel David F. DeMartino, USAF
The Civil Engineer
Directorate of Logistics, Installations and Mission Support
Headquarters Air Education and Training Command
266 F Street West
Randolph AFB TX 78150-4319

U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
Mr. Wally Murphy, Field Supervisor
2105 Osuna NE
Albuquerque, NM 871

RE: Transmittal of A Biological Evaluation (BE) and Request For Concurrence With A May Affect, but is Not Likely To Adversely Affect Determination With Regard To Species Listed Or Proposed For Listing As Endangered Or Threatened Under The Endangered Species Act (ESA)

Dear Mr. Murphy

The attached Biological Evaluation (BE) addresses the United States Air Force (Air Force) Headquarters Air Education and Training Command (HQ AETC) proposal to base a Pilot Training Center with F-35A strike aircraft at Luke AFB, Arizona within FWS Region 2. The BE addresses the potential for project actions to affect species listed or proposed for listing as endangered or threatened under the Endangered Species Act (ESA). Focusing on species that could be affected by training activities within the airspace or by construction and operations at Luke AFB, the BE concludes that the proposed action **may affect, but is not likely to adversely affect** listed or proposed species **and would not adversely modify any critical habitat**. The Air Force is seeking USFWSs concurrence with this determination in compliance with the ESA.

The proposed project involves basing 72 F-35A training aircraft at Luke AFB. When the 72 F-35As are combined with the retirement or relocation of 142 AETC F-16 aircraft, the total number of airfield operations conducted at Luke AFB and activities within most associated airspace units would decrease.

Summary of Potential Effects: Proposed facility construction, renovation, and/or demolition would occur in previously disturbed areas at Luke AFB. Operations at Luke AFB for the F-35A would include mission and training programs similar to those conducted with the existing aircraft. No federally listed, proposed, or candidate species are known or expected to occur at Luke AFB; therefore, nc adverse effects are anticipated from construction or operations there.

All F-35A flight activities would occur in existing airspace; therefore, no airspace modifications would be required. F-35A activities on training ranges and in the airspace would be similar to those of the F-16s, which would be replaced by the F-35As. Due to the F-35A conducting proportionately more sorties at higher altitudes than the F-16, the potential to startle wildlife from the noise and sudden appearance of overflying aircraft would be reduced. Only 15 percent of F-35A flight hours would be below 10,000 feet Above Ground Level (AGL), whereas 96 percent and 56 percent of the flight hours of A-10s and F-16s, respectively, are spent below 10,000 feet. Guided munitions used for training with the F-35A would be expected to be released from higher altitudes than conventional munitions employed by aircraft currently using the training ranges. Munitions use would be confined to existing target areas within existing restricted airspace. The F-35A would conduct supersonic training only in airspace units and at altitudes that are currently authorized for supersonic training. No supersonic flight would be authorized on Military Training Routes (MTRs). Sonic booms generated by F-35A aircraft would be expected to be similar in terms of overpressure and frequency of boom events per sortie to sonic booms generated by F-16 aircraft. The addition of F-35A supersonic operations would be offset by decreases in F-16 supersonic operations. Overall noise levels and the projected average number of sonic booms per day would decrease under the Proposed Action beneath all primary training airspace units and would range from one to two booms per day or less, depending on the location.

Potential adverse effects on eight endangered, threatened, proposed, or candidate species known are known to occur or that may occur under airspace proposed for project use are specifically addressed in the attached BE. These species include the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Sonoran pronghorn (*Antilocapra americana sonoriensis*), Southwestern willow flycatcher (*Empidonax traillii extimus*), Mexican spotted owl (*Strix occidentalis lucida*), Sonoran Desert population of the bald eagle (*Haliaeetus leucocephalus*), masked bobwhite (*Colinus virginianus ridgewayi*), Yuma clapper rail (*Rallus longirostris yumanensis*), mountain plover (*Charadrius montanus*), western DPS of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and Sonoran (Morafka's) desert tortoise (*Gopherus agassizii/Gopherus morafkai*).

The analysis concludes that any response to overflight or sonic boom would be temporary and not reach the scale at which "take" occurs (as defined in the ESA) and that the probability of a bird-aircraft strike involving injury to a listed, proposed, or candidate species is so low as to be discountable. Therefore, it is concluded that the project **may affect, but is not likely to adversely affect** listed or proposed species **and would not adversely modify any critical habitat**. We request USFWS written concurrence with this determination in compliance with the ESA.

DEMARTINO.DAVID.F.1048930243

DAVID F. DeMARTINO, Colonel, USAF, P.E.
The Civil Engineer

Attachment: Biological Evaluation

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
AESO/SE
22410-2010-I-0353
02-21-2005-F-0492
22410-1996-F-R003
02-21-92-F-066

November 25, 2011

Colonel David F. DeMartino, USAF
The Civil Engineer
Directorate of Logistics, Installations and Mission Support
Headquarters Air Education and Training Command
266 F Street
Randolf Air Force Base, Texas 78150-4319

Re: Request for Concurrence with Determinations - Basing a Pilot Training Center with F-35A Aircraft at Luke Air Force Base, Maricopa County, Arizona

Dear Colonel DeMartino:

Thank you for your correspondence received on October 24, 2011. This letter documents our review of the Biological Evaluation of Basing a Pilot Training Center with F-35A Aircraft at Luke AFB, Arizona (BE), in Maricopa County, in compliance with section 7 of the Endangered Species Act of 1973 (ESA) as amended (16 U.S.C. 1531 et seq.). Your letter concluded that the proposed project "may affect, but is not likely to adversely affect" the lesser long-nosed bat *(Leptonycteris curasoae yerbabuenae)*, Sonoran pronghorn (*Antilocapra americana sonoriensis*), Southwestern willow flycatcher (*Empidonax traillii extimus*), Mexican spotted owl (*Strix occidentalis lucida)*, masked bobwhite (*Colinus virginianus ridgewayi*), Yuma clapper rail (*Rallus longirostris yumanensis*), mountain plover (*Charadrius montaus*), yellow-billed cuckoo (*Coccyzus americanus*), and desert tortoise - Sonoran population (*Gopherus agassizii*).

Description of the Proposed Action

A complete description of the proposed action is found in your biological evaluation (BE) and the accompanying maps received by our office on October 24, 2011. The proposed action is to base 72 F-35A aircraft at Luke Air Force Base including aircraft flight training utilizing airspace over the Barry M Goldwater Range (BMGR), existing military training routes (MTRs) over Arizona and over occasional use airpace over Arizona, New Mexico, and California. Conservation measures for the Sonoran pronghorn supported annually by the Air Force include radio collaring,

Colonel David F. DeMartino, USAF

aerial telemetry flights, diet studies, habitat use and genetics, forage enhancement, and a captive breeding project.

DETERMINATION OF EFFECTS

We will respond to your request for concurrence with your determinations in three categories:

1. Activities and species addressed in the biological opinion dated May 4, 2010 for consultation number 22410-1996-F-0094-R003 "Reinitiation of Formal Section 7 Consultation on Military Training on the Barry M. Goldwater Range East, Maricopa, Pima, and Yuma Counties, Arizona."

2. Use of military training routes on areas other than over the Barry M. Goldwater Range East (addressed in Category 1) and affects to Mexican spotted owl and its critical habitat.

3. Use of military training routes on areas other than over the Barry M. Goldwater Range East (addressed in Category 1) and affects to species other than Mexican spotted owl.

For Category 1, those activities and species addressed in the biological opinion dated May 4, 2010 for consultation number 22410-1996-F-0094-R003 "Reinitiation of Formal Section 7 Consultation on Military Training on the Barry M. Goldwater Range East, Maricopa, Pima, and Yuma Counties, Arizona" we believe, after reviewing the subject BE provided with your letter, that the changes do not trigger reinitiation because, though the action is being modified, we do not anticipate it will cause impacts to listed species not previously considered. That biological opinion addresses effects to Sonoran pronghorn and lesser long nosed bat on the BMGR. All conservation measures, Reasonable and Prudent Measures, and Terms and Conditions included in that Biological Opinion remain in effect.

For Category 2, military aircraft use training routes as described in the BE on areas other than over the Barry M. Goldwater Range East (addressed in Category 1) and affects to Mexican spotted owl and its critical habitat, we note that Biological Opinion 22141-1992-F-066 dated December 12, 1994 for the Realignment and Widening of Military Training Routes: VR-231, VR-239, VR-245, and VR-1220 considered affects to Mexican spotted owl. That Biological Opinion includes a Reasonable and Prudent Measure (RPM)

> "3. Avoid active Mexican spotted owl nesting and roosting areas during the breeding season (February 1 – August 31) by re-routing aircraft on MTRs one nautical mile laterally to either side of each nesting/roosting area. When the exact location of the nesting area is unknown, re-route aircraft on MTRs one nautical mile laterally to either side of the spotted owl "management territory." If the MTRs fly over previously unsurveyed suitable habitat, or over areas for which surveys are outdated, conduct or financially support Forest Service and/or AGFD survey efforts to determine the presence/absence spotted owls. Conduct or financially support Forest Service and/or AGFD efforts to monitor compliance with reasonable and prudent measures.

and a Term and Condition

> "2. The following terms and conditions will implement reasonable and prudent measure 3. Coordinate with the tonto National Forest and AGFD to determine extent of surveys in affected areas, where additional surveys need to be conducted, and for information on the distribution and breeding status of spotted owls within MTRs. Financially support Forest service and/or AGFD surveys and monitoring efforts. Minimum funding should cover Forest Service and/or AGFD costs for monitoring and evaluating spotted owl use within MTRs and effects of overflights."

Based on the information you provided and our understanding of this project, we do not at this time have enough information to concur with your determination that the proposed action on military training routes outside the Barry M. Goldwater Range may affect, but is not likely to adversely affect species the Mexican spotted owl. We base this determination on the following:

- There is no reference to any studies or monitoring or to the RPM cited above from the 1994 Biological Opinion in the present subject BE.
- There is no discussion of effects to designated critical habitat for the Mexican spotted owl in the BE.
- While the BE, at Sec. 5.2.2, states that "no low level flight training below 500 ft would occur using the F-35A", the references to noise effects of fixed wing jet aircraft in Table 6-1 refer to flights at 2,000 ft and 3,000 ft over MSO habitat, which is not compelling evidence of effects at 500 ft over habitat.

For Category 3, military aircraft use of military training routes on areas other than over the Barry M. Goldwater Range East (addressed in Category 1) and affects to species other than Mexican spotted owl (addressed in Category 2), we concur with your determinations and provide our rationales below.

For Southwestern willow flycatcher

- Project effects are likely to be limited to brief periods of overflight as aircraft cross over riparian woodland habitat which is very localized under the airspace. These effects are insignificant.
- The likelihood of any direct or indirect interaction between the proposed action and primary constituent elements is extremely low; therefore, any effects to critical habitat are assumed to be discountable.

For masked bobwhite

- Project effects are likely to be limited to brief periods of overflight as aircraft cross over suitable habitat which is very localized under occasional use airspace. These effects are insignificant.

For Yuma clapper rail and lesser long nosed bat

- Project effects are likely to be limited to brief periods of overflight as aircraft cross over suitable marsh habitat which is very localized under the airspace. These effects are insignificant.

The mountain plover (*Charadrius montaus*), western DPS of the yellow billed cuckoo (Coccyzus americanus occidentalis), and Sonoran (Morafka's) population of the desert tortoise (*Gopherus agassizii*) are not listed under the Endangered Species Act at this time and require no further analysis.

We also note that your letter and the BE do not address potential effects to the Mohave population of the desert tortoise, which is found under identified occasional use airspace over California shown on Figure 2-2 in the BE. The Mohave population is listed as threatened under the Endangered Species Act with designated critical habitat. Potential adverse effects to desert tortoise in California should be considered and a determination made by the Air Force for use of the occasional use airspace as part of the proposed action.

To facilitate the additional consultation we encourage you to provide additional information regarding 1) effects to Mexican spotted owl from use of the MTRs and 2) for use of the occasional use airspace over California. In all future correspondence on this project, please refer to consultation number 22410-2010-I-0492. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

Thank you for your continued coordination. Should you require further assistance or if you have any questions, please contact Bill Werner (x217) or Debra Bills (x239).

Sincerely,

for Steven L. Spangle
Field Supervisor

ccs (electronic):
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Tucson AZ
(Attn: S. Sferra, S. Richardson, E. Fernandez, J. Servoss)
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff AZ (Attn: S. Hedwall)
Assistant Field Supervisor, Fish and Wildlife Service, Phoenix, AZ (Attn: L. Fitzpatrick, G. Beatty)

W:William Werner\F 35 A letter draft 11 23 11.docx:cgg

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

March 28, 2012

HQ AETC/A7CD
266 F Street West, Building 901
Randolph AFB TX 78150-4319

U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
Mr. Wally Murphy, Field Supervisor
2105 Osuna NE
Albuquerque NM 87113

Subject: Transmittal of a Revised Biological Evaluation (BE) and Request for Concurrence with a May Affect, but is Not Likely to Adversely Affect Determination With Regard to Species Listed or Proposed for Listing as Endangered or Threatened Under the Endangered Species Act (ESA) (Reference AESO/SE 22410-2010-I-0353; 02-21-2005-F-0492; 22410-1996-F-R003; 02-21-92-F-066).

Dear Mr. Murphy

The attached Revised Biological Evaluation (BE) addresses the Service's November 25, 2011 response to the United States Air Force (Air Force) Headquarters Air Education and Training Command (HQ AETC) BE regarding its proposal to base a Pilot Training Center with F-35A strike aircraft at Luke Air Force Base (AFB), Arizona within the Fish and Wildlife Service (FWS), Region 2. This BE addresses the maximum impact alternative addressed in the Draft Environmental Impact Statement (EIS) (Scenario L6 with 144 F-35A aircraft) to ensure that ESA Section 7 consultation is adequate for any number of F-35A aircraft up to 144 at Luke AFB that may be selected. Scenario L6 (144 F-35A aircraft) will be referenced as the "proposed action" in this letter and the attached BE for the purposes of ESA compliance only. The BE addresses the potential for project actions to affect species listed, or proposed for listing, as endangered or threatened under the ESA. Focusing on species that could be affected by training activities within the airspace or by construction and operations at Luke AFB, the revised BE concludes that the proposed action **may affect, but is not likely to adversely affect,** listed or proposed species **and would not adversely modify any critical habitat**. The Air Force is seeking the Service's concurrence with this determination in compliance with the ESA.

The Service's November 25, 2011 letter, referenced above, concurs with most of the findings of the original BE. However; it encourages that additional information be provided to facilitate consultation regarding (1) effects to the Mexican spotted owl (MSO) from use of Military Training Routes (MTRs); and (2) use of occasional use airspace over California, where the Mojave population of desert tortoise, listed as threatened, and designated critical habitat exist. This letter and the attached BE address both of these issues

Additionally, with regard to the MSO, the Service's letter:

1. References a 1994 Biological Opinion pertaining to widening and realigning MTRs over MSO habitat and identifies that there is no reference to, or information regarding compliance with, a Reasonable and Prudent Measure (RPM) and a term and condition from that Biological Opinion.
2. Indicates that there is no discussion of effects to designated critical habitat for the MSO.
3. Indicates that references cited "refer to flights at 2,000 ft (feet) and 3,000 ft over MSO habitat do not provide compelling evidence of effects at 500 ft over habitat".

With regard to the first item, Luke AFB is compliant with the 1994 Biological Opinion regarding MSO, bald eagle, and peregrine falcon. In the late 1990s, Luke AFB provided funds to Tonto National Forest and Arizona Game & Fish Department to support survey efforts for MSO and nest monitoring for bald eagles. Our remaining institutional knowledge recalls that $18,000 was provided to Tonto National Forest to support MSO surveys and monitoring. However, it appears the funds were used to support overall surveys and monitoring for owls rather than at the specific sites underlying our training routes. Afterward, the focus and concern of all parties regarding this Biological Opinion shifted to bald eagles. Luke AFB has continuously provided funds each year to support the successful Arizona Bald Eagle Nestwatch program, and the 56th Fighter Wing at Luke AFB is a signatory to the 2007 Memorandum of Understanding for Conservation of the Bald Eagle in Arizona and a continuing partner in the Southwest Bald Eagle Management Committee. For additional information about the 1994 Biological Opinion, please contact John Arnett (623-856-8491) at Luke AFB.

With regard to the second and third items, the revised BE references the results of a six-year study of overflight effects on MSO that was previously unavailable to the authors of the BE. That study (attached), which was conducted by the Air Combat Command in response to a Biological Opinion, found that aircraft overflight had no effect on occupancy of MSO activity centers and found no correlations among measures of aircraft exposure and nesting success. Additionally, no flushing or loss of adults or young was observed in response to any aircraft overflights including 40 observations of military jet aircraft overflight that came within 500 ft of owls. The results of this five-year study support a determination that project-related overflights at a minimum altitude of 500 ft Above Ground Level (AGL) as proposed on MTRs overlying MSO critical habitat would have insignificant effects on MSO, not reaching the scale at which take occurs. Additionally, the revised BE addresses the potential effects on designated MSO critical habitat, identifies the primary constituent elements, and concludes there would be no adverse modification of designated MSO critical habitat.

When the 144 F-35As based at Luke AFB are combined with the retirement or relocation of 142 AETC F-16 aircraft as part of this project, the total number of airfield operations conducted at Luke AFB and activities within many of the associated airspace units would decrease. With basing of 144 F-35A aircraft at Luke AFB, flight activities over MSO critical habitat would decrease compared to the baseline except on MTR VR-239, on which the number of overflights would increase from approximately 272 to 354 sortie-operations annually.

Summary of Potential Effects: Proposed facility construction, renovation, and/or demolition would occur in previously disturbed areas at Luke AFB. Operations on Luke AFB for the F-35A would include mission and training programs similar to those conducted with the existing aircraft. No federally listed, proposed, or candidate species are known or expected to occur on Luke AFB; therefore, no adverse effects are anticipated from construction or operations there.

All F-35A flight activities would occur in existing airspace; therefore, no airspace modifications would be required. F-35A activities on training ranges and in the airspace would be similar to those of the F-16s operated by AETC, which would be replaced by the F-35As. Due to the F-35A conducting proportionately more sorties at higher altitudes than the F-16, the potential to startle wildlife from the noise and sudden appearance of overflying aircraft would be reduced. Only 15 percent of F-35A flight hours would be below 10,000 ft AGL, whereas 96 percent and 56 percent of the flight hours of A-10s and F-16s, respectively, are spent below 10,000 ft AGL. Additionally, under the proposed action, annual training activities with the F-35A would decrease on most MTRs compared to existing conditions.

Areas identified as occasional use airspace are existing airspace and ranges that have no projected sortie-operations. They would generally receive infrequent use by the F-35A such as when inclement weather or scheduling issues prevent the F-35A from utilizing the primary use airspace. Use of occasional use airspace by the F-35A is expected to be incidental and minor compared to the proposed use of primary use airspace by the F-35A. Such use would be expected to have insignificant effects on the listed Mohave population of the desert tortoise that would not reach the scale at which take would occur and would not adversely modify designated critical habitat.

Guided munitions used for training with the F-35A would be expected to be released from higher altitudes than conventional munitions employed by aircraft currently using the training ranges. Munitions use would be confined to existing target areas within existing restricted airspace. The F-35A would conduct supersonic training only in airspace units and at altitudes that are currently authorized for supersonic training. No supersonic flight would be authorized on MTRs. Sonic booms generated by F-35A aircraft under the proposed action would be less frequent with 144 F-35A aircraft than under the baseline of F-16 training. Sonic booms in all training airspace units would range from one to two booms per day or less, depending on the location.

Potential adverse effects on nine endangered, threatened, proposed, or candidate species known to occur or that may occur under airspace proposed for project use are specifically addressed in the attached BE. These species include the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Sonoran pronghorn (*Antilocapra americana sonoriensis*), masked bobwhite (*Colinus virginianus ridgwayi*), southwestern willow flycatcher (*Empidonax traillii extimus*), Yuma clapper rail (*Rallus longirostris yumanensis*), Mexican spotted owl (*Strix occidentalis lucida*), western Distinct Population Segment (DPS) of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*), Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*), Mojave population of the desert tortoise (*Gopherus agassizii*), and Sonoran (Morafka's) desert tortoise (*Gopherus agassizii/Gopherus morafkai*).

The analysis concludes that any response to overflight or sonic boom would be temporary and not reach the scale at which "take" occurs (as defined in the ESA) and that the probability of a bird- aircraft strike involving injury to a listed, proposed, or candidate species is so low as to be discountable. Therefore, it is concluded that the project **may affect, but is not likely to adversely affect** listed or proposed species **and would not adversely modify any critical habitat**. We request the Service's written concurrence with this determination in compliance with the ESA.

Sincerely

James E. Fitzpatrick

JAMES E. FITZPATRICK, GS-15, P. E.
Deputy to The Civil Engineer

Attachments:
1. Revised Biological Evaluation
2. ACC MSO Study 2008

cc: Stephen L. Spangle, Field Supervisor, U.S. FWS, Arizona Ecological Services Field Office

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

March 28, 2012

HQ AETC/A7CD
266 F Street West, Building 901
Randolph AFB TX 78150-4319

U.S. Fish and Wildlife Service Arizona Ecological Services Office
Stephen L. Spangle, Field Supervisor
2321 West Royal Palm Road, Suite 103
Phoenix AZ 85021-4951

Subject: Transmittal of a Revised Biological Evaluation (BE) and Request for Concurrence with a May Affect, but is Not Likely to Adversely Affect Determination With Regard to Species Listed or Proposed for Listing as Endangered or Threatened Under the Endangered Species Act (ESA) (Reference AESO/SE 22410-2010-I-0353; 02-21-2005-F-0492; 22410-1996-F-R003; 02-21-92-F-066).

Dear Mr. Spangle

The attached Revised Biological Evaluation (BE) addresses the Service's November 25, 2011 response to the United States Air Force (Air Force) Headquarters Air Education and Training Command (HQ AETC) BE regarding its proposal to base a Pilot Training Center with F-35A strike aircraft at Luke Air Force Base (AFB), Arizona within the Fish and Wildlife Service (FWS), Region 2. This BE addresses the maximum impact alternative addressed in the Draft Environmental Impact Statement (EIS) (Scenario L6 with 144 F-35A aircraft) to ensure that ESA Section 7 consultation is adequate for any number of F-35A aircraft up to 144 at Luke AFB that may be selected. Scenario L6 (144 F-35A aircraft) will be referenced as the "proposed action" in this letter and the attached BE for the purposes of ESA compliance only. The BE addresses the potential for project actions to affect species listed, or proposed for listing, as endangered or threatened under the ESA. Focusing on species that could be affected by training activities within the airspace or by construction and operations at Luke AFB, the revised BE concludes that the proposed action **may affect, but is not likely to adversely affect,** listed or proposed species **and would not adversely modify any critical habitat**. The Air Force is seeking the Service's concurrence with this determination in compliance with the ESA.

The Service's November 25, 2011 letter, referenced above, concurs with most of the findings of the original BE. However; it encourages that additional information be provided to facilitate consultation regarding (1) effects to the Mexican spotted owl (MSO) from use of Military Training Routes (MTRs); and (2) use of occasional use airspace over California, where the Mojave population of desert tortoise, listed as threatened, and designated critical habitat exist. This letter and the attached BE address both of these issues

Additionally, with regard to the MSO, the Service's letter:

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When the 144 F-35As based at Luke AFB are combined with the retirement or relocation of 142 AETC F-16 aircraft as part of this project, the total number of airfield operations conducted at Luke AFB and activities within many of the associated airspace units would decrease. With basing of 144 F-35A aircraft at Luke AFB, flight activities over MSO critical habitat would decrease compared to the baseline except on MTR VR-239, on which the number of overflights would increase from approximately 272 to 354 sortie-operations annually.

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All F-35A flight activities would occur in existing airspace; therefore, no airspace modifications would be required. F-35A activities on training ranges and in the airspace would be similar to those of the F-16s operated by AETC, which would be replaced by the F-35As. Due to the F-35A conducting proportionately more sorties at higher altitudes than the F-16, the potential to startle wildlife from the noise and sudden appearance of overflying aircraft would be reduced. Only 15 percent of F-35A flight hours would be below 10,000 ft AGL, whereas 96 percent and 56 percent of the flight hours of A-10s and F-16s, respectively, are spent below 10,000 ft AGL. Additionally, under the proposed action, annual training activities with the F-35A would decrease on most MTRs compared to existing conditions.

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Guided munitions used for training with the F-35A would be expected to be released from higher altitudes than conventional munitions employed by aircraft currently using the training ranges. Munitions use would be confined to existing target areas within existing restricted airspace. The F-35A would conduct supersonic training only in airspace units and at altitudes that are currently authorized for supersonic training. No supersonic flight would be authorized on MTRs. Sonic booms generated by F-35A aircraft under the proposed action would be less frequent with 144 F-35A aircraft than under the baseline of F-16 training. Sonic booms in all training airspace units would range from one to two booms per day or less, depending on the location.

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The analysis concludes that any response to overflight or sonic boom would be temporary and not reach the scale at which "take" occurs (as defined in the ESA) and that the probability of a bird- aircraft strike involving injury to a listed, proposed, or candidate species is so low as to be discountable. Therefore, it is concluded that the project **may affect, but is not likely to adversely affect** listed or proposed species **and would not adversely modify any critical habitat**. We request the Service's written concurrence with this determination in compliance with the ESA.

Sincerely

James E. Fitzpatrick

JAMES E. FITZPATRICK, GS-15, P. E.
Deputy to The Civil Engineer

Attachments:
1. Revised Biological Evaluation
2. ACC MSO Study 2008

cc: Mr. Wally Murphy, U.S. FWS, New Mexico Ecological Services Field Office

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
AESO/SE
22410-2010-I-0353
02-21-2005-F-0492
22410-1996-F-R003
02-21-92-F-066

April 26, 2012

Mr. James E. Fitzpatrick, P.E.
Deputy to the Civil Engineer
Department of the Air Force, Air Education and Training Command
HQ AETC/A7CD
266 F Street West, Building 901
Randolf Air Force Base, Texas 78150-4319

Re: Revised - Request for Concurrence with Determinations - Basing a Pilot Training Center with F-35A Aircraft at Luke Air Force Base, Maricopa County, Arizona

Dear Mr. Fizpatrick:

Thank you for your correspondence of March 28, received on March 29, 2012, transmitting a Revised Biological Evaluation. This letter documents our review of the revised Biological Evaluation of Basing a Pilot Training Center with F-35A Aircraft at Luke AFB, Arizona, dated March 2012 (BE), in Maricopa County in compliance with section 7 of the Endangered Species Act of 1973 (ESA) as amended (16 U.S.C. 1531 et seq.). Your letter concluded that the proposed project "may affect, but is not likely to adversely affect" the lesser long-nosed bat *(Leptonycteris curasoae yerbabuenae)*, Sonoran pronghorn (*Antilocapra americana sonoriensis*), masked bobwhite (*Colinus virginianus ridgewayi*, Southwestern willow flycatcher (*Empidonax traillii extimus*) and its critical habitat, Yuma clapper rail (*Rallus longirostris yumanensis*), Mexican spotted owl (*Strix occidentalis lucida)* and its critical habitat, western Distinct Population Segment (DPS) of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*), Tucson shovel-nosed snake (Chionactis occidentalis klauberi), Mojave population of the desert tortoise (*Gopherus agassizii*) and its critical habitat, and Sonoran (Morafka's) desert tortoise (*Gopherus agassizii/Gopherus morafkai*). Your BE concludes that the project "may affect but is not likely to contribute to the need for Federal listing" for candidate species western Distinct Population Segment (DPS) of the yellow-billed cuckoo, Tucson shovel-nosed snake, and Sonoran (Morafka's) desert tortoise. Evaluating the effects of the proposed action as it contributes to the need for Federal listing of candidate species is beyond the scope of Section 7 consultation. Candidate species are not addressed further. We concur with your determinations for listed species and provide our rationales below.

Description of the Proposed Action

A complete description of the proposed action is found in your revised biological evaluation (BE) and the accompanying maps received by our office on March 29, 2012 and in subsequent meeting materials and e-mail correspondence dated April 25, 2012. The revised proposed action is to base 144 F-35A aircraft at Luke Air Force Base including aircraft flight training utilizing airspace over the Barry M. Goldwater Range (BMGR), existing military training routes (MTRs) over Arizona, and over occasional use airspace over Arizona, New Mexico, and California. Conservation measures for the Sonoran pronghorn supported annually by the Air Force include radio collaring, aerial telemetry flights, diet studies, habitat use and genetics studies, forage enhancement, and a captive breeding project. Conservation measures for Mexican spotted owl include maintaining an airspace clearance of one fourth statute mile (1/4 mi.) over Mexican spotted owl Protected Activity Centers (PACs).

DETERMINATION OF EFFECTS

We will respond to your request for concurrence with your determinations in two categories:

1. Activities and species addressed in the biological opinion dated May 4, 2010 for consultation number 22410-1996-F-0094-R003 "Reinitiation of Formal Section 7 Consultation on Military Training on the Barry M. Goldwater Range East, Maricopa, Pima, and Yuma Counties, Arizona."

2. Use of military training routes, military operating areas, and other airspace on areas other than over the Barry M. Goldwater Range East.

For Category 1, those activities and species addressed in the biological opinion dated May 4, 2010 for consultation number 22410-1996-F-0094-R003 "Reinitiation of Formal Section 7 Consultation on Military Training on the Barry M. Goldwater Range East, Maricopa, Pima, and Yuma Counties, Arizona" we believe, after reviewing the subject BE provided with your letter, that the changes do not trigger reinitiation because, though the action is being slightly modified by use of different aircraft, we do not anticipate it will cause impacts to listed species not previously considered. That biological opinion addresses effects to Sonoran pronghorn and lesser long nosed bat on the Barry M. Goldwater Range East. All conservation measures, Reasonable and Prudent Measures, and Terms and Conditions included in that Biological Opinion remain in effect.

For Category 2, military aircraft use of military training routes, military operating areas, and other airspace on areas other than over the Barry M. Goldwater Range East (addressed in Category 1) we concur with your determinations and provide our rationales below.

Southwestern Willow Flycatcher with critical habitat

- Effects are insignificant because project effects are limited to brief periods of overflight as aircraft cross over riparian woodland habitat which is very localized under the airspace.

- The likelihood of any direct or indirect interaction between the proposed action and primary constituent elements is so low it is unlikely to occur; therefore, any effects to critical habitat are discountable.

Masked bobwhite

- Project effects are insignificant because they are limited to brief periods of overflight as aircraft cross over suitable habitat which is very localized under occasional use airspace.

Yuma clapper rail

- Project effects are insignificant because they are limited to brief periods of overflight as aircraft cross over suitable marsh habitat which is very localized under the airspace.

Lesser long nosed bat

- These effects are insignificant because the majority of project effects would occur during daylight hours when bats are inactive. Project effects to habitat are not anticipated as aircraft cross over suitable habitat suitable habitat.

Mojave population of desert tortoise with critical habitat

- These effects are insignificant because project activities would occur above 5,000 feet above ground level on an infrequent, unscheduled, basis creating a buffer between the activity and tortoise on the ground.

- The likelihood of any direct or indirect interaction between the proposed action and primary constituent elements is so low it is unlikely to occur; therefore, any effects to critical habitat are discountable.

Mexican spotted owl with critical habitat

- Implementation of conservation measures will ensure the effects of project activities to MSO are insignificant because PACs are protected by a ¼ mile airspace clearance.

- Project activities would occur in airspace above ground level. The likelihood of any direct or indirect interaction between the proposed action and primary constituent elements is so low it is unlikely to occur; therefore, any effects to critical habitat are discountable.

Please note, some projects may potentially impact species that are protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sec. 703-712) and/or bald and golden eagles protected under the Bald and Golden Eagle Protection Act (BGEPA). Prohibitions under the MBTA include the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except as specifically authorized by the FWS. If you believe migratory birds will be affected by the project, we recommend you contact our Migratory Bird

Permit Office, P.O. Box 709, Albuquerque, NM 87103, (505) 248-7882 or by email *FW2_birdpermits@fws.gov*. For more information regarding the MBTA and permitting process, please visit the following web site: *http://www.fws.gov/migratorybirds/mbpermits.html*. For information on protections for bald eagles under the BGEPA, please refer to the FWS's National Bald Eagle Management Guidelines (72 FR 31156) and regulatory definition of the term "disturb" (72 FR 31132) that were published in the Federal Register on June 5, 2007. Existing take authorizations for bald eagles issued under the ESA became covered under the BGEPA via a final rule published in the Federal Register on May 20, 2008 (73 FR 29075).

Please note specifically that the bald eagle, previously addressed in Biological Opinion 2-21-1992-F-066, dated December 12, 1994, "Realignment and Widening of Military Training Routes: VR-231, VR-239, VR-245, and VR-1220", is no longer listed under the Endangered Species Act but remains listed under BGEPA. Thank you for the explanation regarding funding of studies and monitoring from that Biological Opinion.

Thank you for your continued coordination. No further section 7 consultation is required for this project at this time. Should project plans change, or if information on the distribution or abundance of listed species or critical habitat becomes available, this determination may need to be reconsidered. In all future correspondence on this project, please refer to consultation number 22410-2010-I-0353. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

Should you require further assistance or if you have any questions, please contact Bill Werner (x217) or Debra Bills (x237).

Sincerely,

For Steven L. Spangle
Field Supervisor

ccs (electronic):
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Field Supervisor, Fish and Wildlife Service, Albuquerque, NM
Assistant Field Supervisor, Fish and Wildlife Service, Palm Springs, CA
Assistant Field Supervisor, Fish and Wildlife Service, Tucson AZ
(Attn: S. Sferra, S. Richardson, E. Fernandez, J. Servoss)
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff AZ (Attn: S. Hedwall)
Assistant Field Supervisor, Fish and Wildlife Service, Phoenix, AZ (Attn: L. Fitzpatrick, G. Beatty)

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